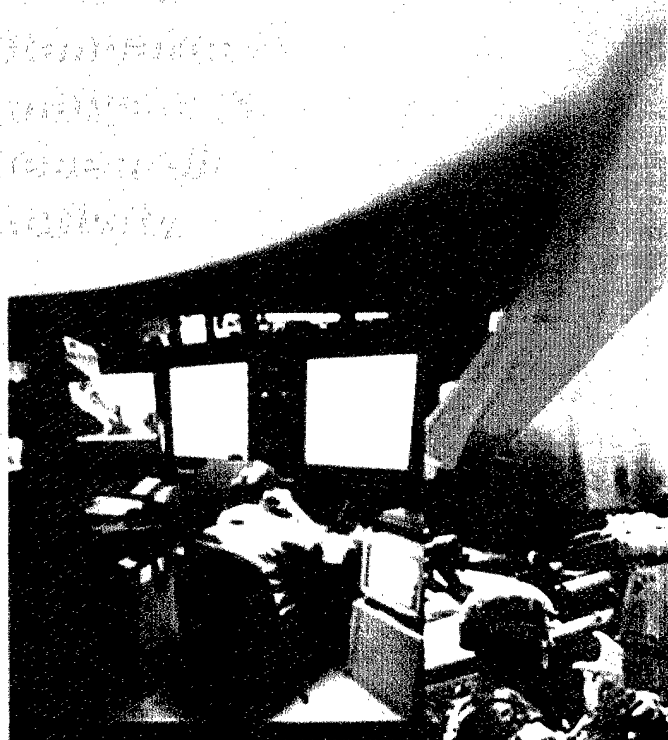


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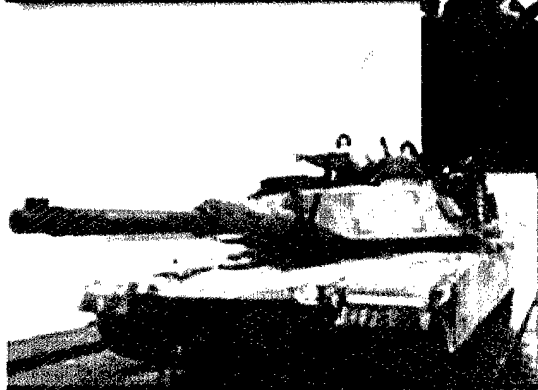
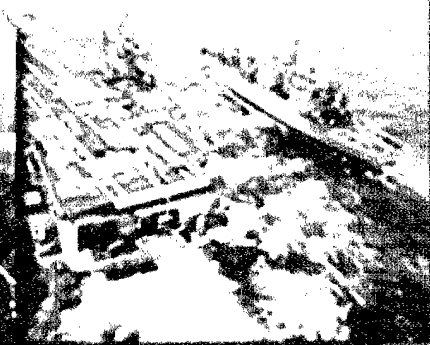
AMSBARA

Annual Report 2002

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Executive Summary

The Accession Medical Standards and Research Activity (AMSARA) **has completed its sixth year of providing the DoD with evidence-based evaluations of accession standards.** Approximately 263,000 applicants were examined for medical fitness at MEPS in 2001, and approximately 11% of applicants were initially disqualified for service due to present standards. More than 4,000 enlisted applicants enter active duty with waivers for these conditions every year. However, more than 5,000 recruits receive discharges for conditions not disclosed at MEPS. In all over 7,000 EPTS discharges occur every year during basic training, rarely among those who have been granted waivers for the same condition. AMSARA uses scientific approaches to evaluate accession standards and retention programs. These efforts improve military readiness by maximizing both the accession and retention of motivated and highly capable recruits.

Requests for data analysis remained substantial in 2002, testament to AMSARA's focus and expertise in using epidemiological principles in analyses, that leads to evidence based standards.

Survival analyses were completed on three conditions arising in the first six months of service: injury hospitalized, hearing loss waived, and psychiatric hospitalized. **In recruits hospitalized for injury during the first three months of service, the likelihood of retention is significantly higher compared to those hospitalized for non-injury conditions, but less than those not hospitalized. The likelihood of early attrition is noticeably higher among enlistees entering the Navy with a medical accession waiver for hearing deficiency than among a matched sample of recruits entering without needing a waiver and with waivers for other conditions. In recruits hospitalized for psychiatric conditions (except drug and alcohol disorders) during the first three months of service, the likelihood of retention is significantly lower compared to those hospitalized for non-psychiatric conditions.**

In 2002 AMSARA began the **Fort Leonard Wood Initial Entry Training Discharge Review.** The aim of this US Army Accessions Command sponsored study is to assess the degree of agreement in discharge classification between the IET site and AMSARA. The study period will be the 12-month period September 2002 – August 2003. **Particular focus will be given to whether certain types of discharges are more likely than others to have a co-existing mental or other medical condition.**

Asthma continues to be a major cause for disqualifications (~3,000/year), waivers (~500/year), and EPTS discharges (~1,000/year) and therefore remains a focus of AMSARA research.

Project REMAIN, which completed enrollment in June 2002, will continue to examine the medical and operational impact of allowing known mild asthmatics to stay on active duty at Great Lakes Naval Training Center. The significantly higher rate of discharge of mild asthmatics early in training appears to level off to rates comparable with

controls after graduation. Follow-up of study participants will be completed June 2003, and final analysis presented in the 2003 annual report.

AMSARA continued another **asthma study at Fort Jackson and Fort Knox in 2002 to characterize recruit medical failures from asthma and to identify potential asthma screening criteria.** AMSARA is considering expanding to additional Initial Entry Training Sites in 2003.

Most asthma EPTS discharges continue to be among those who conceal their condition at MEPS. **AMSARA is field-testing a device to measure exhaled nitric oxide** at Baltimore Medical Entrance Processing Station to determine whether this measurement will be a useful adjunct to the current screening (i.e., history) at MEPS. This study is funded by the US Army Accession Command. The goal is to test 3,000 applicants for exhaled nitric oxide and determine whether this test may be a useful adjunct to the physical exam in processing applicants to the US military. Research funding is being sought to study individuals with markedly high nitric oxide levels.

Mental health conditions reduce medical readiness. In response to the need for further research and intervention, **AMSARA initiated a Small Business Initiative Research proposal (two Phase II grants were funded for this effort in 2003) to field-test prototype psychiatric condition screens suitable for use at MEPS.** Collaborative efforts to develop interventions to improve retention are ongoing with the Division of Neuropsychiatry at Walter Reed Army Institute of Research.

In 2002 AMSARA has performed **in-depth reviews of EPTS records for several medical conditions of interest.** This has been done in coordination with the Accessions Medical Standards Working Group quarterly reviews for the revision of DoD Instruction 6130.4 scheduled for completion in 2004. **Reviews of scoliosis and hearing loss raised questions about the validity and compliance with current accession standards as well as the quality of screening practices.**

Two studies on **attrition modeling** are presented in this report. The first attempts to detect meaningful changes in short term attrition through a random effect model. The second attempts to adjust for variation in medical and demographic factors associated with attrition across the 65 MEPS.

Introduction

The Accession Medical Standards Steering Committee was established by the Undersecretary of Defense (Personnel and Readiness) to integrate the medical and personnel communities so they could provide policy guidance and establish standards for accession requirements. These standards would stem from evidence-based information provided by analysis and research. The committee is co-chaired by the Deputy Assistant Secretary of Defense (Military Personnel Policy) and the Deputy Assistant Secretary of Defense (Clinical and Program Review). Its members include representatives from the Office of the Assistant Secretary of Defense (Force Management Policy), Office of the Assistant Secretary of Defense (Health Affairs), Office of the Assistant Secretary of Defense (Reserve Affairs), Offices of the Service Surgeons General, Offices of Service Deputy Chiefs of Staff for Personnel, and Chief of Personnel and Training (Headquarters, U.S. Coast Guard).

The Accession Medical Standards Working Group is a subordinate working group that reviews accession policy issues. This group is comprised of representatives from each of the offices listed above.

AMSARA was established in 1996 within the Division of Preventive Medicine at Walter Reed Army Institute of Research to support the efforts of the Accession Medical Standards Working Group. AMSARA's mission is to support the development of evidence-based accession standards by guiding the improvement of medical and administrative databases, conducting epidemiologic analyses, and integrating relevant operational, clinical, and economic considerations into policy recommendations. AMSARA has the following six main objectives:

- Validate current and proposed standards (e.g., should asthma as a child be disqualifying?);
- Validate assessment techniques (e.g., improve current screening tools);
- Perform quality assurance (e.g., monitor geographic variation);
- Optimize assessment techniques (e.g., develop attrition prediction model);
- Track impact of policies, procedures, and waivers;
- Recommend changes to enhance readiness, protect health, and save money.

Military staffing to support this effort includes the Deputy Director, Division of Preventive Medicine, COL Margot R. Krauss, and the Chief, AMSARA, LTC David W. Niebuhr.

AMSARA is augmented with contract support through Allied Technology Group (ATG). Current staff includes Project Manager, James Onaitis; Senior Biostatistician, Dr. Yuanzhang Li; Senior Analyst, Timothy Powers; Statistician, Lily Trofimovich; Data Manager, Janice Gary; Data Technician, Lorenzo Kennedy; Editor, Therese Grundl.

1. STUDIES

ATTRITION AMONG ENLISTEES WAIVED FOR HEARING DEFICIENCY: 1995–2000

Introduction

Each year, the U.S. military depends on a constant input of healthy and physically fit individuals. An applicant's first contact with the military is with a service recruiter who, among other tasks, screens for disqualifying medical conditions. Applicants who superficially meet these initial criteria for enlistment then undergo a more formal medical history review and examination at a Military Entrance Processing Station (MEPS).

Although some applicants are disqualified after the MEPS medical examination, each service retains the authority to grant an accession waiver for disqualifying medical conditions on an individual basis. Once a disqualified individual is granted a waiver, he or she is considered to be qualified and fit for enlisted service. Over the past 7 years, hearing deficiency has been the most common condition for which a waiver was granted, comprising slightly more than 10% of all accession medical waivers.

The purpose of this study was to compare the performance of active duty individuals waived for a hearing condition, in terms of retention, with other recruits. In particular, the likelihood of retention over time was compared between 1) a matched subject group with waivers for nonhearing conditions and 2) a group with no medical waivers.

Methods

The study population was comprised of all Air Force, Army, Marine, and Navy enlistees beginning active duty from 1 January 1995 to 31 December 2000. This population was divided into three groups of enlistees: those who had needed an accession medical waiver for a disqualifying hearing deficiency, those who had needed an accession medical waiver for a medical condition unrelated to hearing, and those who did not need a medical waiver for any condition. All subjects were followed prospectively for any cause of attrition (i.e., administrative, medical, or other) until 31 December 2000.

Demographic analysis showed that recruits waived for hearing deficiency were significantly different from the two comparison groups. Hence, demographically matched samples of these comparison groups were selected at a 1:1 ratio for the "nonhearing waiver" group and a 1:3 ratio for the "no waiver" group. The matched factors were service, month began active duty, gender, age, race, Armed Forces Qualification Test (AFQT) score, and body mass index (BMI).

Crude and adjusted loss rates in the hearing waiver group were compared with those in the two comparison groups. A product-limit nonparametric model and a proportional hazards semiparametric model were used. To refine these comparisons, the survival probability and

attrition rates were estimated by service. In addition to matching factors, the proportional hazards modeling controlled for education level, height, weight, and marital status.

Results

Approximately 900,000 active duty enlistments occurred during 1995–2000. Of these, 29,000 (3.1%) required a medical waiver for at least one disqualifying condition. Table 1.1 shows the demographic distributions of those waived for hearing deficiency, along with the demographic distributions of all enlistees. Those waived for hearing deficiency were more likely to be male and older and to have a lower AFQT score and non-ideal BMI than the general military population. For example, females are 20% of all Army enlistees, 17% of Navy enlistees, and 7% of Marine enlistees. Among those waived for hearing deficiency, however, the analogous female percentages were only 12%, 9%, and 4%, respectively.

TABLE 1.1. DEMOGRAPHIC DISTRIBUTION OF ENLISTEES WAIVED FOR HEARING AND OF ALL ENLISTEES: 1995–2000

		Army		Navy		Marines		Air Force	
		Hearing n=1863	All	Hearing n=621	All	Hearing n=439	All	Hearing n=12	All
Gender	Female	11.6	20.1	9.2	17.0	4.3	7.0	16.7	26.3
	Male	88.4	79.9	90.8	83.0	95.7	93.0	83.3	73.7
Age	17–20	56.5	68.2	60.7	75.3	72.7	83.1	75.0	75.0
	21–22	17.2	14.4	18.4	12.9	14.8	10.0	16.7	14.4
	>23	26.3	17.4	20.9	11.9	12.5	6.9	8.3	10.5
Race	Other	10.7	9.6	16.9	10.6	10.3	12.6	0.0	7.9
	Black	13.0	23.6	10.6	20.5	5.0	13.2	25.0	16.3
	White	76.3	66.8	72.5	68.9	84.7	74.3	75.0	75.7
AFQT	1 and 2	34.0	37.2	35.9	40.7	33.0	38.7	66.7	49.6
	3	64.3	60.6	63.1	58.9	65.8	60.1	33.3	49.2
	4 and 5	1.7	2.2	1.0	0.4	1.1	1.1	0.0	1.2
BMI	Heavy (30+)	6.8	6.5	2.3	3.5	8.7	5.4	8.3	0.7
	Light (<20)	10.4	11.9	14.5	12.9	11.6	10.9	25.0	14.2
	Overweight (25–30)	32.0	30.2	32.4	31.3	31.7	29.7	33.3	26.7
	Ideal (20–25)	50.8	51.4	50.9	52.2	48.1	53.9	33.3	58.3

Table 1.2 shows the numbers of subjects in the hearing deficiency waiver group and in the two comparison groups. With the large number of matching factors used, it was not possible to find complete matches for all subjects in the “other waiver” group, but the shortage was minimal. The selected sample will be used for the further analysis.

TABLE 1.2. THE SELECTED MATCHED SAMPLES

Waivers	Army	Navy	Marines	Air Force
None	5,541	1,839	1,290	36
Other	1,711	554	388	9
Hearing	1,863	621	439	12

Figures 1.1–1.3 show estimated survival (i.e., military retention) probabilities over time by service for the three subject groups. No such analysis is useful for the Air Force because the Air Force had only twelve recruits with a waiver for hearing deficiency.

It can be seen from Figure 1.1 that in the Army those with a waiver for hearing have virtually the same likelihood of retention over time as those waived for other conditions. However, the likelihood of retention for these two groups is significantly uniformly lower than that for recruits with no medical waiver. The difference in retention curves is visually apparent within 50 days of beginning service.

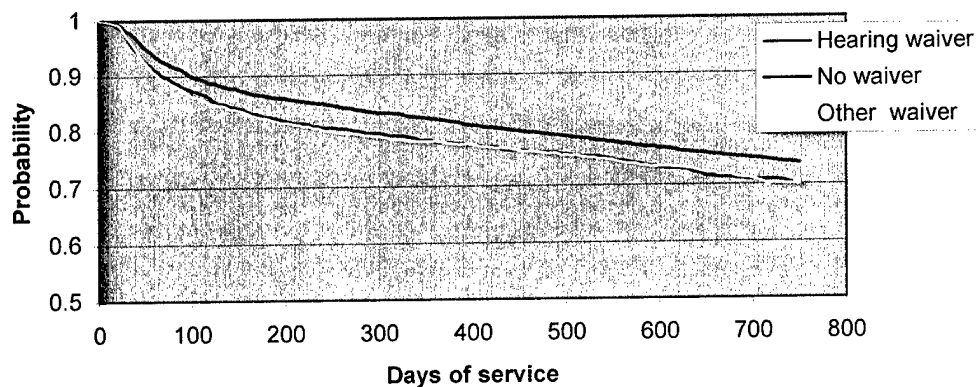


FIGURE 1.1. SURVIVAL LIKELIHOOD OF ARMY SUBJECTS. $P < 0.01$.

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Figure 1.2 shows analogous results for the Navy. Retention of those waived for hearing deficiency is seen to be significantly lower than in either comparison group. It is also clear that retention likelihood drops during the first month of service for all three groups but drops particularly sharply for the hearing waiver group. Somewhat surprisingly, retention among the "other waiver" group is significantly higher than among those with no waiver.

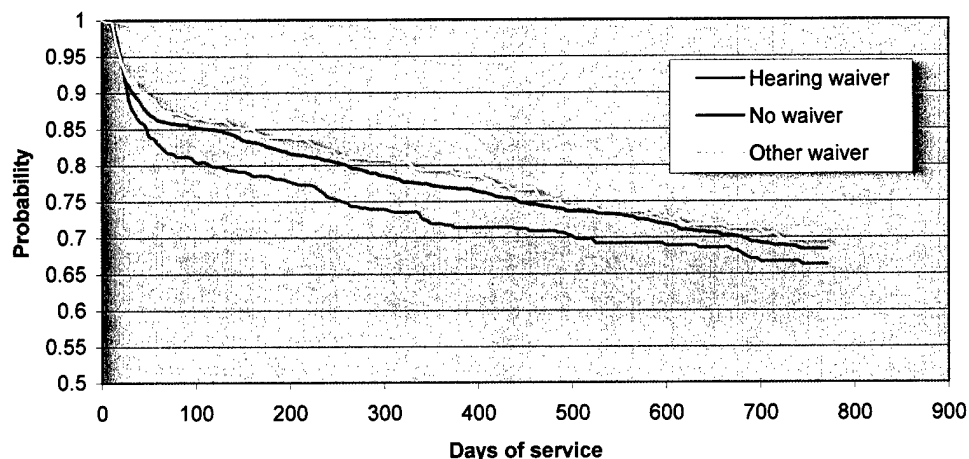


Figure 1.2. Survival likelihood of Navy subjects. $p < 0.05$.

These results for the Navy may be surprising but can be explained. The high retention among those waived for nonhearing conditions may reflect the fact that waivers are generally only given to recruits with strong potential to succeed and indicates that this approach has been successfully applied. The elevated attrition among hearing waivers may stem from the fact that the Navy conducts baseline audiograms of all recruits on arrival at basic training and therefore obtains more detailed information about hearing than is available through the MEPS exam. Definitive explanation of this observation would require further study.

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Figure 1.3 shows analogous results for the Marines. Retention probability curves for the three subject groups are similar and even cross several times. There was no significant difference in the curves.

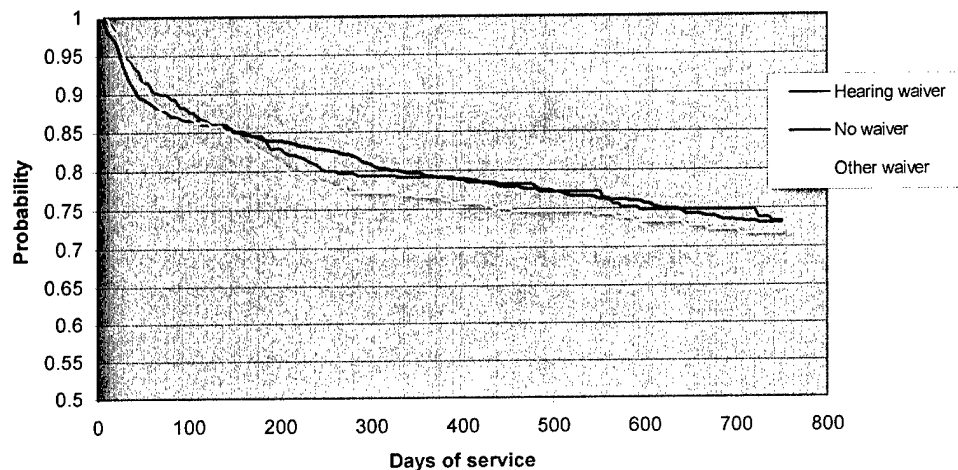


FIGURE 1.3. SURVIVAL LIKELIHOOD OF MARINE SUBJECTS. $P > 0.5$.

In order to control for additional factors, a semiparametric Cox proportional model was applied to the matched sample. Hazard ratios comparing each of the two waiver groups were used to study attrition. These hazard ratios can be interpreted as the likelihood of discharge for a waived individual relative to that of a nonwaived individual within a given time. Statistical significance of a hazard ratio implies that the attrition rate is significantly higher for the group granted waivers than for the nonwaiver group. Hazard ratio estimates are presented at the 6-month, 1-year, and 3-year points and are adjusted for the variables in the modeling.

After adjusting for the effect of the control variables, the hazard ratios for the hearing deficiency waiver group were found to be significantly higher than the ratios for the nonwaiver group in the Army and Navy (Table 1.3). The lower likelihood of retention for the hearing deficiency waiver group could not be explained by the additional factors that were included in the proportional hazards modeling.

Hazard ratio estimates comparing retention among the hearing deficiency waiver group with retention among the other waiver group are not shown, although they can be estimated as the

ratio of hazards ratios shown in Table 1.3. These hazards ratios were generally close to unity, indicating that after controlling for other factors related to attrition, the likelihood of retention after a hearing deficiency waiver is roughly the same as retention after a nonhearing waiver.

TABLE 1.3. ADJUSTED RETENTION HAZARD RATIOS FOR ENLISTEES WAIVED FOR HEARING AND FOR OTHER CONDITIONS RELATIVE TO THOSE WITHOUT WAIVERS AT 0.5, 1, AND 3 YEARS OF DUTY

Years of duty	Waivers	Relative risk	95% CI	
0.5 Years	Army	Hearing	1.29	1.13, 1.47
		Others	1.52	1.33, 1.73
	Navy	Hearing	1.39	1.13, 1.72
		Others	1.16	0.92, 1.46
	Marines	Hearing	1.07	0.81, 1.41
		Others	1.02	0.75, 1.37
1 Year	Army	Hearing	1.26	1.12, 1.42
		Others	1.42	1.26, 1.60
	Navy	Hearing	1.42	1.18, 1.70
		Others	1.15	0.93, 1.42
	Marines	Hearing	1.12	0.87, 1.44
		Others	1.03	0.78, 1.35
3 Years	Army	Hearing	1.15	1.05, 1.27
		Others	1.25	1.13, 1.37
	Navy	Hearing	1.36	1.15, 1.60
		Others	1.07	0.89, 1.29
	Marines	Hearing	1.12	0.89, 1.39
		Others	1.10	0.87, 1.39

Results in Table 1.3 look at all-cause attrition among the subject groups; thus any differences in discharge likelihoods may or may not be directly related to the condition for which the subject was waived. Table 1.4 shows losses and percentages among the three subject groups specifically for conditions that existed prior to service (EPTS). These EPTS discharges were divided according to whether the discharge was related to a hearing condition. Note in these analyses that reporting of EPTS discharges is incomplete or is not uniform across services, so any direct assessments of the percentages or comparisons are dubious at best. Percentages are, however, useful in comparing the three subject groups by service.

TABLE 1.4. EPTS DISCHARGES BY SUBJECT GROUP

EPTS condition	Army		Navy		Marines		Air Force	
	No.	%	No.	%	No.	%	No.	%
No waiver								
Hearing	1	0.0	0	0.0	1	0.1	0	0.0
Nonhearing	232	4.2	86	4.7	44	3.4	0	0.0
Non-EPTS	5,308	95.8	1,753	95.3	1,245	96.5	36	100.0
Hearing waiver								
Hearing	34	1.8	18	2.9	5	1.1	0	0.0
Nonhearing	86	4.6	51	8.2	21	4.8	0	0.0
Non-EPTS	1,743	93.6	552	88.9	413	94.1	12	100.0
Other waiver								
Hearing	1	0.1	0	0.0	0	0.0	0	0.0
Nonhearing	161	9.4	46	8.3	16	4.1	0	0.0
Non-EPTS	1,549	90.5	508	91.7	372	95.9	9	100.0

The first three rows in Table 1.4 show the percentages of EPTS discharges among the subjects with no medical waiver. These results can be used as a guideline for what to expect from the waiver groups if a waiver has no effect on the likelihood of subsequent EPTS discharge. It can be seen that among these 8,706 no-waiver subjects across all services, only two had an EPTS discharge for a hearing-related condition (one in the Army and one in the Marines). When considering nonhearing causes of EPTS discharges among these no-waiver subjects, the percentages ranged from 3.4% in the Marines to 4.7% in the Navy.

Within the hearing waiver group, the likelihood of an EPTS discharge for a hearing-related condition was higher than the background rates from the nonwaiver group. Specifically, within this group, 34 (1.8%) Army subjects, 18 (2.9%) Navy subjects, and 5 (1.1%) Marines received an EPTS discharge for a hearing-related condition. The percentages of EPTS discharges for nonhearing conditions were also higher among these subjects than among the nonwaiver group in each service, although the difference was only pronounced in the Navy.

The third set of results shows EPTS losses and percentages among waivers for nonhearing conditions. The percentage of hearing-related EPTS discharges is low, similar to that among the nonwaiver group. However, the percentage of EPTS discharges for other causes was much higher than among the nonwaiver groups for each service.

Discussion

The likelihood of early attrition is noticeably higher among enlistees entering the Army or the Navy with a medical accession waiver for hearing deficiency than among a matched sample of recruits entering these services without needing a waiver. No such difference was observed among subjects entering the Marines, and the Air Force had too few subjects for comparison. These findings were still observed after controlling for additional factors related to attrition likelihood.

When comparing with subjects with waivers for other conditions, the hearing deficiency waiver group performed about the same in the Army and Marines, implying that those with hearing waivers are no less likely to be retained by these services than those with nonhearing

medical waivers. Among the Navy subjects, however, the hearing waiver group had lower retention rates than their matched counterparts with waivers for other conditions, although this latter group had better retention rates than even the nonwaiver group in the Navy. Further examination of these findings will be required before meaningful conclusions can be drawn.

When looking specifically at discharges for preexisting medical conditions, the likelihood of such a discharge for a hearing condition was considerably higher in the hearing waiver group than in the other two groups for each service. The raw rates of such discharges were no higher than 3%, although these raw percentages are somewhat suspect given the lack of uniform data reporting. The likelihood of EPTS discharge in the hearing waiver group for nonhearing conditions was no different than among the nonwaiver group.

Although the current study indicates which conditions might warrant further study, there are some caveats. Most importantly, the standards for granting a waiver may vary across services or across medical conditions within a service. This study considers only the primary condition for which a waiver was granted. In some instances, two or more disqualifying conditions are identified for an applicant, and any waiver granted would cover all such conditions. Restricting attention to those with waivers for hearing only could refine attrition predictions by eliminating the potential effect of other medical conditions. Study of those granted waivers for multiple conditions might also yield interesting results.

Further studies should include a comparison of screening audiograms at the MEPS to baseline audiograms performed at initial entry training. A cost-effectiveness analysis of performing baseline audiograms at the MEPS vs initial entry training may also be useful.

LOSS OF RECRUITS TO SERIOUS INJURY: ASSESSING THE DEGREE OF THE PROBLEM

Over 1995–2001, approximately 9% of all hospitalizations of enlisted personnel within the first year of service were due to injury, the second leading cause of hospitalizations for this early service time (psychological conditions are first). In addition to the costs of these hospitalizations, further cost is added if such injuries also elevate the risk of subsequent attrition. This study addresses several key questions surrounding injury hospitalizations: 1) What are the rates of serious injuries among demographic subpopulations of recruits during the first 2 years of service? 2) What is the likelihood of early discharge after hospitalization for an injury? and 3) How does the risk of early discharge compare with that of nonhospitalized recruits?

Attrition after injury hospitalization is fairly low relative to that after hospitalization for other causes (2001 AMSARA Annual Report, p 18). The current study expands on that study by adding a comparison group of subjects who were not hospitalized to detect if injury hospitalization has any impact on likelihood of retention. This study also used matched comparisons to account for possible differences in demographics.

Subjects, Risk Factors, and Methods

The study population was comprised of all first-time enlistees in the Air Force, Army, Marines, and Navy who started active duty from January 1995 through December 1999. All enlistees were followed prospectively for at least 12 months and at most 2 years of service for a first-time military hospitalization. Those having such a hospitalization were classified according to the primary reason for hospitalization (injury or other). Those categorized as injury were further subclassified according to the nature of the injury (fracture, sprain, etc.).

Likelihood of early hospitalization was determined for injuries as a category and then for the diagnostic subgroups. The distributions of hospitalized subjects were also examined by several demographic factors previously found to be related to the likelihood of injury. Comparison of these factors with the demographics of the entire recruit population was performed using chi-square tests. Univariate assessment of risk factors for hospitalization consisted of standard relative risk computations.

After establishing the likelihood of injury hospitalization early in service, attrition likelihood subsequent to injury hospitalization was also examined using survival analysis techniques. Specifically, enlistees with an injury hospitalization during the first 2 years of service were followed for up to 3 years after the initial hospitalization for loss from the service.

To provide a basis for comparison that controls for other attrition risk factors, we selected two groups of matched comparison subjects on which retention time was also examined. The first comparison group consisted of subjects hospitalized for conditions other than injuries. These subjects were matched on a 1:1 basis on service, gender, age, race, month of beginning active duty, and month of hospitalization.

The second comparison group consisted of individuals who were not hospitalized during the first 2 years of active duty. These subjects were matched on a 3:1 basis to the injury

hospitalization subjects on gender, age, race, and month of beginning active duty. In addition, these subjects must have still been on active duty when their injury-hospitalized counterparts were hospitalized (this point is referred to as "image hospitalization"). Product-limit (Kaplan-Meier) nonparametric models were performed for the three subject groups to compare conditional survival likelihoods. Cox proportional hazards modeling was then used to derive conditional attrition risks adjusted for additional factors beyond those accounted for through subject matching.

Information on the enlistee population was obtained from the Defense Manpower Data Center (DMDC) and MEPCOM. Hospitalization data were collected from the Patient Administration Systems and Biostatistics Activity (PASBA) on all admissions occurring among the enlistees from January 1995 through December 2000. Attrition data on these enlistees were collected from DMDC for all losses of enlisted personnel occurring from January 1995 through December 2000. These data were needed in the computation of time at risk for hospitalization and the attrition rates subsequent to hospitalization. (For further details on these data sources, see Section 1.)

Diagnostic categories of hospitalization records were grouped by combining the primary ICD9 diagnostic codes assigned to each hospitalization record. In particular, injury hospitalizations were defined by an admission ICD9 code of 800.*-859.*, 900.*-959.*, B 900, and V540 (where * indicates any decimal extensions). Subcategories of injuries were also determined on the basis of these codes. Multiple admissions of any individual on a given day were counted as one admission.

Hospitalizations by Type of Injury

The percentages of injury hospitalizations by type at various stages of the first term of duty are shown in Table 1.5. Fractures were the most common cause, accounting for roughly 40% of injury hospitalizations over the first 2 years of service; the exact percentages by time served were fairly stable over the first 2 years of service. The percentages of injury hospitalizations accounted for by "open-wound" and "other" injuries increased as the length of time on active duty increased. Conversely, the percentages of injuries accounted for by "superficial wounds" and "sprains" decreased as active duty time increased. This shift in distribution appears to be primarily due to a considerable drop in sprain and superficial injuries after 3 months of service, i.e., after basic combat training (BCT).

The last two rows of Table 1.5 show the total numbers of injury hospitalizations and of individuals accounting for these hospitalizations by the length of time served. It is somewhat surprising that the numbers of injury hospitalizations (and of individuals hospitalized for injury) during the 3-6 months of duty is more than double that seen during the first 3 months of active duty. This is despite the fact that the first 3 months of duty include BCT, a putative high-risk time for injuries. Moreover, given that approximately 15% of all enlistees are discharged before completing BCT, these higher numbers of injuries come from a smaller at-risk group. One possible explanation for the elevated rates is that injuries serious enough to merit hospitalization are more likely to result in discharge than in hospitalization when occurring during BCT. Further scrutiny of this result is warranted.

TABLE 1.5. INJURY HOSPITALIZATION PERCENTAGES BY TYPE

Injury	Admissions by years on active duty			
	0.25 year	0.25–0.5 year	0.5–1 year	1–2 years
Fracture	41.7	44.7	43.8	39.5
Internal	1.4	2.9	3.0	2.5
Intracranial	6.4	8.1	7.6	5.2
Open wound	7.5	10.8	11.0	11.7
Other	16.9	21.9	24.9	29.6
Sprains	9.7	5.2	5.2	6.5
Superficial wounds	10.4	2.1	1.1	0.9
Dislocation	6.0	4.3	3.5	4.0
All injury-related admissions	933	2,200	2,431	2,800
Individuals hospitalized for injury	872	1,911	2,014	2,176

Table 1.6 shows distributions of enlistees hospitalized for injuries and of all enlistees beginning active duty during the study. Demographic characteristics of those hospitalized for injuries were somewhat different from those of the entire enlistee population. Notably, the percentage of females among enlistees hospitalized for injuries was dramatically lower than percentages among the entire recruit population. Because the results include the first 2 years of service, they might reflect differences in risk levels associated with military occupational specialty paths taken by females and males. When restricting the gender comparison to the first 3 months of duty (when all recruits are in BCT and thus presumably at similar injury risk), injury hospitalization rates among females were higher than those among males. Differences in the distributions by age, race, AFQT, and BMI were minor.

TABLE 1.6. DEMOGRAPHIC DISTRIBUTION OF ENLISTEES HOSPITALIZED FOR INJURY WITHIN 2 YEARS OF SERVICE, AND OF ENTIRE RECRUIT POPULATION: 1995–1999

Factor	Army		Navy		Marines		Air Force	
	Injury	Entire	Injury	Entire	Injury	Entire	Injury	Entire
Gender								
Female	12.9	19.8	12.0	16.9	3.9	7.2	16.9	26.5
Age								
17–20	64.2	65.0	68.5	70.0	75.9	77.9	68.7	69.1
21–25	28.0	27.5	26.3	25.0	21.5	19.6	29.1	28.1
26–30	6.2	5.9	3.6	3.9	2.5	2.4	2.2	2.8
>31	1.6	1.6	1.6	1.2	0.1	0.1	0.0	0.0
Race								
White	71.8	67.2	71.1	69.8	75.2	74.2	75.5	74.9
Black	19.3	22.8	20.4	20.3	12.4	13.2	14.9	16.2
Others	8.9	10.1	8.5	9.9	12.4	12.6	9.6	9.0
AFQT								
93–99	8.2	7.1	3.2	5.4	3.5	3.8	5.2	6.0
65–92	32.1	32.9	32.0	33.8	34.6	34.6	45.1	44.2
31–64	57.6	57.7	59.6	54.4	61.5	60.0	49.3	48.1
<31	2.2	2.3	5.2	6.5	0.4	1.6	0.4	1.8
BMI								
<18	1.1	1.4	1.2	2.2	1.2	1.4	1.6	2.4
18–19	9.0	10.6	10.1	11.0	9.1	9.6	8.9	12.0
20–25	51.9	51.4	51.7	52.6	53.8	54.3	60.3	58.8
25–29	32.0	30.0	32.8	30.9	30.8	29.4	28.5	26.1
≥30	6.1	6.5	4.1	3.4	5.1	5.3	0.7	0.7

Attrition Rates after Hospitalization

Subjects

Table 1.7 shows the numbers of subjects in the attrition study by group: those hospitalized for injury, a comparison group of those hospitalized for other conditions, and a second comparison group of those not hospitalized. In addition to demographic factors, the matching accounted for the time of the initial hospitalization. For the nonhospitalized matches, the individual must still have been on active duty at the time when the injury-hospitalized counterpart was admitted to the hospital.

TABLE 1.7. ENLISTEES HOSPITALIZED FOR INJURY WITHIN 2 YEARS OF SERVICE AND THEIR SELECTED MATCHES

Subject group	Army	Navy	Marines	Air Force	Total
Hospitalized for injury	3,335	1,238	1,579	821	6,973
Matched other hospitalized	3,334	1,236	1,576	819	6,965
Matched nonhospitalized	10,005	3,714	4,737	2,463	20,919

Kaplan-Meier Survival Analysis

Figures 1.4–1.6 show the conditional probability of retention after hospitalization for an injury within various lengths of active duty. Also shown are the analogous retention probabilities for the two comparison groups. Note that these results combined subjects from the four services; results examined by service yielded the same essential conclusions

It can be seen from Figure 1.4 that likelihood of retention is significantly higher among those hospitalized for injury during the first 3 months of service compared with those hospitalized for other conditions during the first 3 months ($p < 0.01$). For example, the estimated probability of retention at 182 days (i.e., 6 months) after initial hospitalization is approximately 70% for the injury hospitalization group compared with only 57% for those hospitalized for other conditions.

Note that this other hospitalizations group includes a relatively large number of individuals hospitalized for psychologic/psychiatric conditions. A previous study showed that such individuals are likely to be discharged from the service almost immediately after release from the hospital¹. The effect of including these individuals is seen in the survival curve for the other hospitalizations group, where there is a steep decline in retention probability soon after the hospitalization.

It can be seen, however, that the injury-hospitalized individuals were uniformly less likely to be subsequently retained than those who were not hospitalized ($p < 0.01$). For the nonhospitalized group, the survival follow-up for each subject begins when his or her matched injury-hospitalized counterpart was hospitalized. For example, the probability of retention for the uninjured group at 182 days after their matched injury-hospitalized counterparts were hospitalized was roughly 85%, compared with the 70% among the injury group.

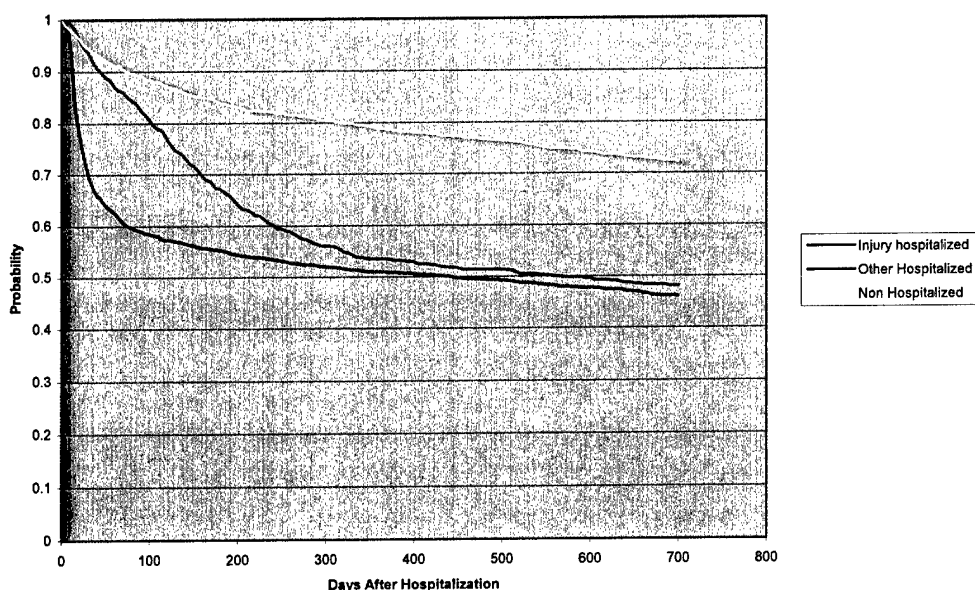


FIGURE 1.4. CONDITIONAL SURVIVAL LIKELIHOOD AFTER FIRST HOSPITALIZATION WITHIN 0-3 MONTHS OF SERVICE.

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Figure 1.5 shows the conditional survival curves for those who were first hospitalized within 3–6 months after beginning active duty. The subsequent survival likelihood of those hospitalized in the second 3 months was higher than the likelihood of those hospitalized within 3 months. That is, those who had successfully remained on active duty for 3–6 months before being hospitalized were more likely to be subsequently retained than those who were hospitalized closer to the beginning of service. The survival likelihood was the highest for those not hospitalized, next highest for those hospitalized for injury, and lowest for those hospitalized for other causes. Each of these was significantly different from the other two ($p < 0.01$).

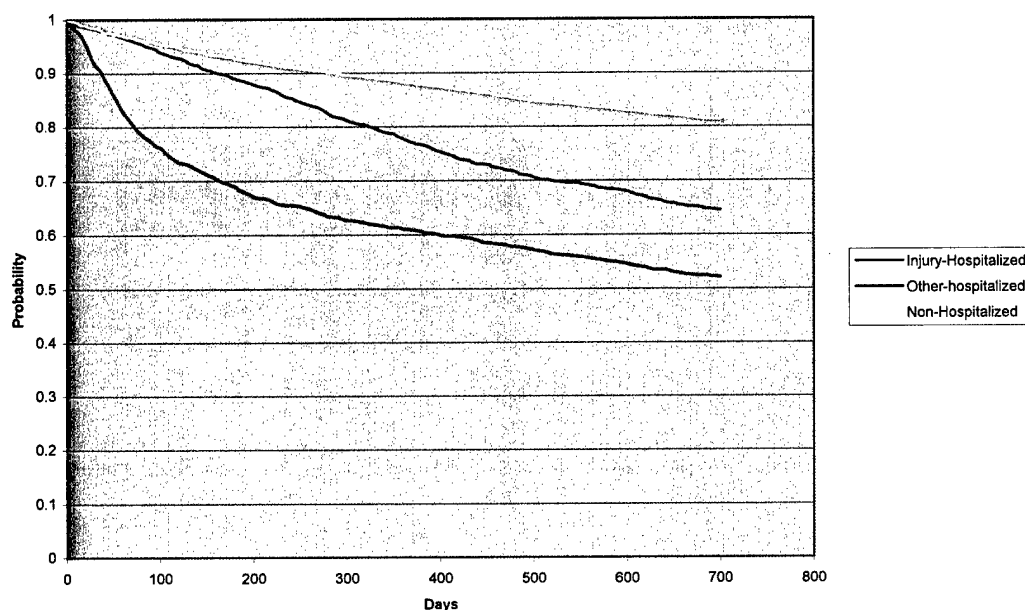


FIGURE 1.5. CONDITIONAL SURVIVAL LIKELIHOOD AFTER FIRST HOSPITALIZATION WITHIN 3–6 MONTHS OF SERVICE.

Figure 1.6 shows the conditional survival curves for those who were first hospitalized within 6–12 months of beginning active duty. Again, the survival likelihood was highest for those not hospitalized, next highest for those hospitalized for injury, and lowest for those hospitalized for other reasons. The difference between the injury hospitalization group and the nonhospitalized group was considerably less than that seen when the hospitalization occurred earlier in the service. Nonetheless, the difference between those two categories was still highly significant, with $p < 0.01$. These two groups were both significantly different from the survival pattern among those hospitalized within 6–12 months for other reasons.

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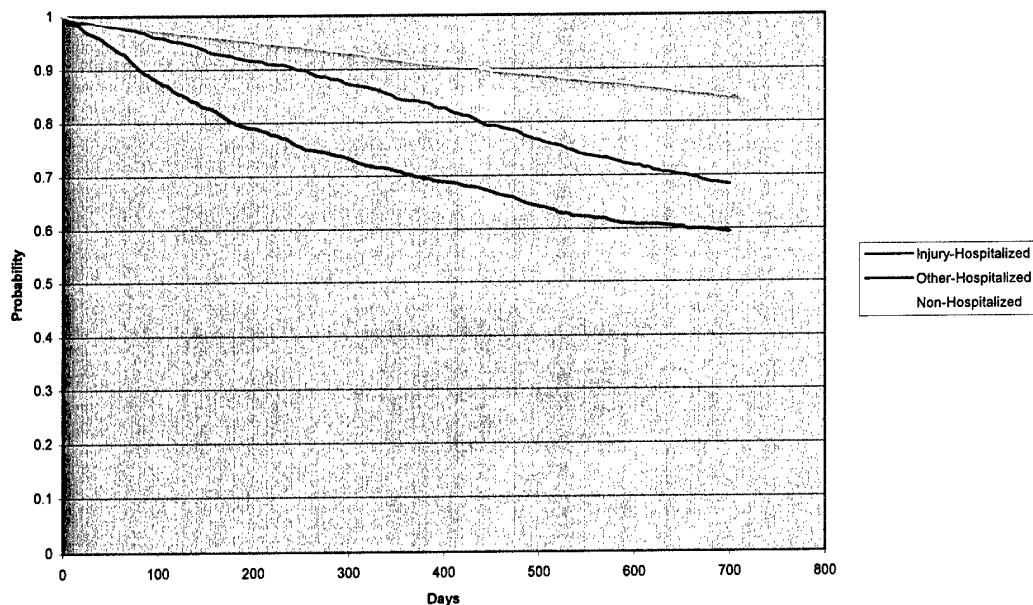


FIGURE 1.6. CONDITIONAL SURVIVAL LIKELIHOOD SINCE FIRST HOSPITALIZATION WITHIN 6–12 MONTHS OF SERVICE.

Raw Attrition Rates

Table 1.8 shows estimated attrition probabilities by specific injury type for various lengths of time. For comparison, the analogous probabilities for the matched healthy subject group (i.e., nonhospitalized) are shown. As was demonstrated by Figures 1.4–1.6, the biggest differences in attrition between injury-hospitalized and nonhospitalized groups is generally when the hospitalization occurred during the first 3 months of service. For example, those hospitalized for a fracture during the first 3 months of service are estimated to have a 32.6% chance of attrition within 6 months of the hospitalization, whereas the matched comparison group has only a 15.0% chance of attrition within 6 months. For hospitalization for fracture occurring 3–6 months into service, the subsequent 6-month attrition rates are the same for the injured group and comparison group: only 7.1% each.

Six-month attrition after injury hospitalization within the first 3 months was highest for those having a dislocation (41.8%), internal injuries (41.7%), and open wounds (41.2%) than for the other injury types. Attrition after injury hospitalization was the lowest for those having a superficial injury (13.4%), with attrition in this group being even lower than that among the matched nonhospitalization group (17.5%). The relative conditional probabilities of attrition after hospitalization for any type changed somewhat according to the time of injury and increased as the follow-up lengthened.

Note also that the likelihood of subsequent attrition for the most injury types is markedly higher than that for the nonhospitalized group even 3 years after hospitalization. This is generally true even for conditions not showing much attrition difference in the first 6 months after hospitalization. For example, for a fracture hospitalization occurring within 3–6 months of service, the subsequent 6-month attrition rate is no different from that of the comparison

group but is considerably higher after 3 years of follow-up (34.0% vs 22.6%). Again, superficial injury is an exception to this general pattern.

TABLE 1.8. CONDITIONAL ATTRITION PROBABILITIES OF THOSE HOSPITALIZED FOR INJURY AND THEIR MATCHED SUBJECTS

First hospitalized within Injury Type	Total hospitalized	Hospitalized enlistees			Matched nonhospitalized		
		Years since first hospitalization			Years since “image hospitalization”		
		6 months	1 year	3 years	6 months	1 year	3 years
0–3 months							
Fracture	380	32.6	50.3	57.6	15.0	19.4	29.5
Internal	12	41.7	58.3	58.3	2.8	8.3	16.7
Intracranial	60	26.7	38.3	53.3	18.3	22.8	32.8
Open wound	68	41.2	45.6	52.9	15.7	19.1	29.4
Other Injury	112	40.2	55.4	63.4	17.0	21.7	31.3
Sprains	88	38.6	47.7	62.5	17.1	22.0	32.6
Superficial	97	13.4	19.6	29.9	17.5	26.8	33.7
Dislocation	55	41.8	52.7	63.6	18.8	24.2	37.6
4–6 months							
Fracture	944	7.1	17.1	34.0	7.1	11.2	22.6
Internal	61	11.5	23.0	34.4	8.2	10.9	20.8
Intracranial	175	14.3	24.0	36.6	6.9	10.9	24.6
Open wound	231	21.7	29.4	45.5	8.4	12.7	23.1
Other Injury	253	15.0	31.6	47.4	7.0	11.9	22.3
Sprains	112	13.4	28.6	47.3	6.3	11.9	21.1
Superficial	46	10.9	19.6	28.3	11.6	14.5	21.7
Dislocation	89	6.7	18.0	39.3	7.9	12.7	24.0
6 months–1 year							
Fracture	1,010	6.2	12.4	29.4	3.6	7.2	15.8
Internal	70	10.0	12.9	35.7	5.2	7.6	15.2
Intracranial	177	10.2	20.9	35.0	4.7	9.0	17.9
Open wound	253	10.3	16.2	31.6	4.6	8.2	15.0
Other Injury	280	8.9	17.5	37.1	4.6	8.5	20.4
Sprains	122	4.1	10.7	24.6	4.1	8.7	17.8
Superficial	26	7.7	15.4	26.9	5.1	7.7	15.4
Dislocation	76	5.3	13.2	26.3	3.5	7.0	15.4

Accounting for Additional Factors: Cox Proportional Hazards Modeling

Earlier studies have shown that premature attrition likelihood is associated with gender, race, education, AFQT, BMI, and other factors². Although comparison subjects were matched on some of these factors, it was not possible to match on all. Therefore, Cox proportional hazards modeling was employed to account for important but unmatched factors such as BMI, education level, and marital status.

Considering all injuries as one category, the hazard ratios for attrition of the injury-hospitalized subjects are significantly elevated across all services (Table 1.9). The ratios and associated 95% confidence intervals for those hospitalized during the first 3 months of

service were 1.65 (1.44, 1.90) in the Army, 1.84 (1.23, 2.76) in the Navy, 2.62 (2.02, 3.41) in the Marines, and 2.37 (1.65, 3.38) in the Air Force. These hazard ratios, although significantly elevated, are generally lower than those for hospitalizations for non-injury conditions. Similar results were seen for those whose first hospital admission occurred within 4–6 months of beginning active duty and for those who had other times of initial hospitalization (data not shown).

TABLE 1.9. HAZARD RATIOS OF INJURY AND OTHER CAUSE HOSPITALIZED SUBJECTS TO NONHOSPITALIZED CONTROLS BY TIME TO FIRST HOSPITALIZATION AND SERVICE

Time to first hospitalization	Army		Navy		Marines		Air Force	
	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI
0–3 months								
Injuries (all)	1.65	1.44, 1.90	1.84	1.23, 2.76	2.62	2.02, 3.41	2.37	1.65, 3.38
Other Cause	1.92	1.70, 2.16	3.39	2.53, 4.54	2.12	1.66, 2.72	5.92	4.46, 7.86
4–6 months								
Injuries (all)	1.75	1.54, 1.99	2.56	2.11, 3.09	2.55	2.26, 2.88	3.61	3.02, 4.31
Other Cause	2.55	2.26, 2.88	3.02	2.53, 3.61	3.62	3.03, 4.32	2.26	1.73, 2.96

Examination of attrition hazard ratios by injury type shows that the results vary across these types (Table 1.10). For this analysis, the subjects had to be combined across services to have enough subjects in each category for meaningful comparison. Internal (4.08), open wound (2.26), “other injury” (2.33), and sprains (2.17) had significantly high attrition risks expressed as hazard ratios compared with the healthy enlistees. Except for superficial wounds during the first 3 months of service, all injury hospitalization categories had elevated hazard ratios, although not all were significantly elevated. As with the product-limit method analyses shown above, this modeling found that the attrition risk associated with hospitalization for other conditions was considerably higher than that for injury hospitalizations (data not shown).

TABLE 1.10. HAZARD RATIOS OF HOSPITALIZED TO MATCHED HEALTHY ENLISTEES, BY INJURY TYPE AND TIME TO FIRST HOSPITALIZATION

Injury	0–3 months		3–6 months		7–12 months	
	Hazard ratio	95% CI	Hazard ratio	95% CI	Hazard ratio	95% CI
Fracture	2.15	1.82, 2.53	1.59	1.39, 1.80	2.01	1.74, 2.31
Dislocation	1.94	1.28, 2.94	1.87	1.27, 2.74	1.71	0.99, 2.97
Sprains	2.17	1.57, 3.01	2.64	1.88, 3.69	1.39	0.91, 2.12
Intracranial	1.50	0.99, 2.28	1.72	1.29, 2.29	2.23	1.63, 3.05
Internal	4.08	1.40, 11.84	1.85	1.09, 3.13	2.73	1.64, 4.54
Open wound	2.26	1.52, 3.38	2.14	1.68, 2.71	2.40	1.81, 3.17
Superficial	0.84	0.57, 1.25	1.39	0.75, 2.57	2.07	0.81, 5.29
Other injury	2.33	1.74, 3.13	2.47	1.97, 3.10	2.10	1.65, 2.67

Discussion

Injuries account for a relatively large share of hospitalizations in early training. The most common types during the first 2 years of service were fractures, sprains, open wounds, and

intracranial injuries. Superficial injuries were relatively common in the first few months of service (about 10%), essentially during basic training, but were less common thereafter (1–2%).

Attrition within 6 months after injury hospitalization that occurred within the first 3 months of service was quite high (27% in the Army and Navy, 46% in the Marines, and 47% in the Air Force) relative to nonhospitalized counterparts. The same was true to a lesser degree for those who had first hospitalization after a longer service. The attrition rate varied by service, with the higher rate in the Air Force and Marines.

However, attrition after injury hospitalization was seen to be low relative to attrition after hospitalization for other causes. After adjusting for important covariates, the hazard risk of attrition after injury hospitalization during the first 3 months of service varied from 1.65 in the Army to 2.62 in the Marines.

The risk of attrition somewhat varied by injury type. The hazard risk range was 0.8–4.1 for those hospitalized within 3 months, 1.6–2.6 for those hospitalized within 3–6 months, and 1.4–2.7 for those hospitalized within 6 months to 1 year. The fracture, internal, open-wound and other injury categories had slightly high risks relative to their respective counterparts.

Incompleteness and inaccuracy of reporting accessions and discharges to DMDC and hospitalizations and diagnoses to PASBA are limitations of this study.

Future study is needed, particularly on fracture injuries, which accounted for more than 40% of the total injuries. Examination of the intrinsic and extrinsic risk factors for serious injury might lead to reduction of serious injury rates during the first term of service.

References

1. Early Hospitalization on Active Duty: Prognosis for Retention after Hospitalization for a Mental Health Condition, AMSARA Annual Report, 2000.
2. Analysis of Early Attrition of Active Duty Enlistees. AMSARA Annual Report, 1999.

DETECTING MEANINGFUL CHANGES IN SHORT-TERM ATTRITION: RANDOM EFFECT MODEL AND AGREEMENT TESTING

Introduction

Roughly 15% of the 120,000 recruits who begin basic training are discharged before completion, resulting in a replacement cost of over \$500 million per year. Attrition reduction targets are frequently discussed as a sensible means of cost savings, often in the context of short time spans, such as reducing monthly attrition by a specified amount. When a specific attrition reduction goal is established, subsequent data are examined to determine whether the goal is being met. Unfortunately, such a determination is generally difficult to make, because relatively large fluctuations in short-term attrition rates may be caused by seasonal patterns, time trends, differences in the demographic profile of recruits over time, or simply random fluctuations. The aim of this study is to develop attrition modeling that will account for these factors to better detect changes in core attrition rates at short intervals.

Methods

All first-time enlistees beginning active duty service from January 1995 through December 2000 were included in the analyses. The enlistees were grouped according to their month and year of beginning service (accession). For each month/year accession group, attrition percentages during the first 1, 2, and 3 months of service were determined, and a demographic profile was developed that included gender, age, and AFQT score among other factors.

Service-specific attrition rates for each month/year group over the 60 months of 1995–1999 were adjusted for seasonal effects by differencing (subtracting from each month's attrition the mean attrition for that month over the study). Remainder attrition after this differencing for the sequence of month/year groups was then examined for homogeneity and used in a regression against the demographic profiles. Both fixed and random effect models were applied. These regression models were then used dynamically to predict attrition rates for the month/year groups of 2000. Finally, a measure of the agreement between these predicted attrition rates and actual (observed) attrition rates was proposed and used to detect significant differences in actual attrition from expected levels.

Results

Table 1.11 shows predicted and actual 3-month attrition rates as well as the agreements in the Air Force for those beginning service in March 2000. The actual 3-month attrition percentage in the Air Force was 9.7%, somewhat higher than the predicted level of 8.2–8.3%. The z-score for this difference was significant when using the fixed model but not statistically significant ($|z| < 1.96$) when using the random effect model. The latter model was more appropriate for modeling short-term attrition for the Air Force.

**TABLE 1.11. ACTUAL VS PREDICTED ATTRITION AND AGREEMENT TESTING:
AIR FORCE SUBJECTS BEGINNING ACTIVE DUTY IN MARCH 2000**

Model	Actual	Predicted		Agreement z-score
	Loss rate \pm SE	Loss rate \pm SE	Parameter error	
Fixed	0.097 \pm 0.006	0.082 \pm 0.001	N/A	2.43
Random		0.083 \pm 0.002	0.009	1.51

Table 1.12 summarizes the agreement results of modeled vs actual attrition at 1, 2, and 3 months of service for recruits beginning duty January through September 2000. It can be seen that attrition among recruits entering in January was significantly lower than expected in both the Army and Navy at all lengths of follow-up (1, 2, and 3 months). Army attrition was then lower than expected in June and July, whereas Navy attrition was lower than expected in July. Attrition among Marine recruits was higher than expected at virtually all follow-ups from March through July.

It is difficult to determine whether this large number of significant results indicates features of the particular recruit populations that were not included in the modeling or of the ever-changing training environment. The modeling does not appear to have systematic bias, because the actual attrition is roughly evenly distributed above and below predicted levels.

TABLE 1.12. AGREEMENT USING Z-SCORE FOR ENLISTEES GAINED IN 2000

Months since active duty	Army, fixed	Navy, fixed	Marines, fixed	Air Force, random effect
Entered January				
1 month	-3.66	-4.29	0.12	-0.88
2 months	-5.24	-4.18	-0.09	-0.92
3 months	-4.73	-3.78	0.65	-0.42
Entered February				
1 month	-0.33	0.88	-0.93	-1.87
2 months	0.36	0.16	1.90	-1.38
3 months	0.70	-0.52	2.87	-0.82
Entered March				
1 month	1.88	-1.33	3.03	0.51
2 months	0.44	-2.26	4.86	1.61
3 months	-0.28	-1.90	7.12	1.51
Entered April				
1 month	0.44	-0.73	4.71	-0.53
2 months	-1.97	-0.35	6.70	0.33
3 months	-1.65	-0.27	7.12	0.98
Entered May				
1 month	1.22	-0.71	3.11	-3.40
2 months	1.31	-3.69	4.33	-2.22
3 months	2.00	-4.15	3.95	-2.31
Entered June				
1 month	4.11	-5.66	0.57	-2.22
2 months	2.96	-7.53	2.14	-0.72
3 months	3.73	-6.29	2.08	-1.01
Entered July				
1 month	4.42	-1.35	2.00	-0.72
2 months	7.55	-0.80	3.15	0.14
3 months	6.69	-0.66	2.17	0.15
Entered August				
1 month	4.28	-0.30	-1.15	-3.42
2 months	-1.53	-1.23	0.47	-2.65
3 months	-4.21	-1.53	0.72	-2.98
Entered September				
1 month	0.47	-4.40	-3.24	-4.47
2 months	-0.78	-0.41	-0.45	-4.63
3 months	-1.16	-1.11	0.57	-4.36

Discussion

Determining a reason for particular spikes in short-term attrition for a service will require deeper focus on that branch and perhaps on particular basic training sites. For example, examining the two Marine basic training sites separately might indicate if the increase during March–June was a local phenomenon or whether it was observed at both sites.

The coded reasons for discharges during a high attrition might also be compared to see if a spike in one category might indicate group dynamics. For example, occasional episodes of “contagious” psychological problems have been noted within groups of recruits, such as an outbreak of suicide ideation episodes within a recruit class at one training site a few years ago.

Policy changes, traumatic events, and motivational or attitude problems are other possibilities that might be investigated. The past few years have seen a considerable increase in the number of programs designed to keep recruits in basic training who would have been discharged in past years. For example, an injury rehabilitation program at Fort Jackson is now mandatory for recruits with injuries that previously would have led to a discharge. This program has recently been extended to the four additional Army basic training sites. If such a program only delayed attrition, a downward spike in short-term attrition rates would be seen.

Future study of these short-term attrition rates should therefore involve closer collaboration with the services and the individual training sites. Accounting for local phenomena may be the key to fully and successfully modeling and monitoring short-term attrition rates.

PSYCHIATRIC HOSPITALIZATION RATES IN NEW ACCESSIONS AND SUBSEQUENT 6-MONTH ATTRITION

Background

Mental health disorders appear to be the most important source of medical and occupational morbidity for military personnel, with more than 6% of the active duty population seeking outpatient care for a mental health disorder in 1998 and 1999 [1]. Psychiatric disorders are the leading reason for hospitalizations among enlisted personnel within 1 year of accession during 1995–1998 (2000 AMSARA Annual Report, p. 23). Approximately 4% of all new accessions were hospitalized within their first 6 months on active duty; 26% of these were for mental health disorders.

To better understand the attrition pattern related to mental health conditions during the first year of active duty, an in-depth study of the effect of early hospitalization was conducted.

Methods

The analysis included Study subjects of all active duty enlistees who began duty during 1 January 1998 to 31 December 1999 and were hospitalized within their first 6 months of active duty. The rates of hospitalization and survival patterns were compared for psychiatric admission and the five nonpsychiatric categories. Kaplan-Meier survival analysis was performed to compare likelihood of retention for the 6 months after hospital admission.

Multiple logistic regression was performed to examine the association between psychiatric hospitalization and attrition, adjusted for potential factors associated with the risk of attrition such as service, gender, age, race, marital status, and education. Finally, the Interservice Separation Code (ISC), derived by DMDC from service-specific loss codes to describe the discharge type, was examined by hospitalization category. In this analysis, ISCs were grouped into three categories: medical standards not met, medical separation; entry-level separation or physical standards not met, administrative separation; and failure to meet minimum behavioral and performance standards.

Hospitalizations were divided into the following six categories by ICD9 codes: injuries and poisonings (800–999), acute respiratory illness (460–496), musculoskeletal disorders (710–739), digestive disorders (520–579), and all other codes. Psychiatric hospitalizations were divided into eight subcategories of admitting diagnosis: mood disorders, anxiety disorders, psychotic disorders, alcohol/substance disorders, adjustment disorders, somatoform/dissociative disorders, personality disorders, and other mental health disorders.

The ICD9 codes were derived from the Diagnostic and Statistical Manual, Fourth Edition. The rates of hospitalization and survival patterns for the eight psychiatric subcategories were then compared with those of all nonpsychiatric admissions combined. Attrition rates were compared to determine if survival changed if hospitalization occurred in the first 30 days, 1–3 months, and 3–6 months on active duty.

Hospitalization data were obtained from the PASBA Standard Inpatient Data Report. The primary admission diagnosis (ICD9 code) for each hospitalization was used. All

hospitalizations without an ICD9 diagnosis were excluded, as were individuals who had an inconsistent service entry, admission, or discharge date (i.e., those for whom length of service could not be reliably established). Data on accession and discharge from the military, from which the length of service (person-years) can be established, were obtained from DMDC.

Results

Of the 303,433 active duty accessions from 1 January 1998 to 31 December 1999, 6,527 (2.2%) were hospitalized during their first 6 months of active duty. Of these, 120 (1.8%) were excluded, 81 with ICD9 V codes as the primary admitting diagnosis and 39 with inconsistent service entry, admission, or discharge dates.

The final dataset contained 6,407 individuals who were hospitalized at least once during the first 6 months on active duty (Table 1.13). A total of 2,567 psychiatric and 3,840 nonpsychiatric hospitalizations were identified. Females were overrepresented in each hospitalization category. Air Force and whites were overrepresented in psychiatric hospitalizations compared with all recruit accessions.

TABLE 1.13. DEMOGRAPHICS OF ACCESSIONS AND HOSPITALIZATIONS: 1999–2000

Demographics	Recruit accessions (<i>n</i> = 303,433)	All cause hospitalized (<i>n</i> = 6,407)	Psychiatric hospitalized (<i>n</i> = 2,567)	Nonpsychiatric hospitalized (<i>n</i> = 3,840)
Service (%)				
Army	37.9	43.2	32.8	50.2
Navy	25.5	23.5	32.6	17.4
Marines	18.4	14.8	8.2	19.3
Air Force	18.3	18.4	26.4	13.1
Male (%)	81.7	74.7	70.9	77.2
Age (Mean)	20.2	20.5	20.6	20.5
Race (%)				
White	68.8	71.3	74.4	69.2
Black	19.4	18.7	16.9	11.0
Other	10.1	10.1	8.7	19.8
Marital status, single (%)	90.6	90.6	91.1	90.2
HS graduate or more (%)	94.6	93.3	94.3	92.6

The distribution of hospitalizations and rates by diagnostic category is presented in Table 1.14. The all-cause hospitalization rate was 51.7 per 1,000 person-years. The psychiatric rate per thousand person-years was 20.3, compared with 30.9 for all non-psychiatric conditions combined. Adjustment disorders were the most common psychiatric condition, with a rate of 11.6 per 1,000 person-years, and accounted for 57.7% of all psychiatric hospitalizations.

**TABLE 1.14. HOSPITALIZATION AND RATES FOR NEW ACCESSIONS
WITHIN FIRST 6 MONTHS ON ACTIVE DUTY BY DIAGNOSTIC CATEGORY**

Diagnosis	No. admitted	Rate per 1,000 person-years
All Psychiatric	2,567	20.3
Adjustment	1,481	11.6
Mood	320	2.6
Personality	281	2.3
Psychotic	276	2.2
Anxiety	75	0.6
Alcohol/substance	70	0.6
All other	53	0.5
Somatoform/dissociative	11	0.1
Non-psychiatric	3,840	30.9
Acute respiratory	808	6.4
Injury and poisoning	666	5.3
Gastrointestinal	552	4.4
Musculoskeletal	229	1.8
All other	1,585	12.6
Total	6,407	51.7

Table 1.15 shows attrition percentages at 6 months after hospitalization by diagnostic category. The overall attrition percentage within 6 months of hospitalization was 53.2%, including 89.0% for psychiatric and 29.3% for nonpsychiatric diagnoses. The attrition percentage for seven of the eight psychiatric subcategories ranged from 88.0% for psychotic to 90.9% for mood disorders. Alcohol and substance disorders accounted for only 70 hospitalizations (1.1% of all hospitalizations) but had a much lower subsequent attrition percentage (61.4%) compared with the other psychiatric disorders. These are compared with 29.3% for all nonpsychiatric admissions combined.

TABLE 1.15. HOSPITALIZATIONS AND 6-MONTH ATTRITION PERCENTAGE BY DIAGNOSES

Diagnosis	No.	%	6-Month attrition (%)
All psychiatric	2,567	40.0	89.0
Adjustment	1,481	23.1	90.1
Mood	320	5.0	90.9
Personality	281	4.4	89.0
Psychotic	276	4.3	88.0
Anxiety	75	1.2	89.3
Alcohol/substance	70	1.1	61.4
Somatoform/dissociative	11	0.2	90.9
Other mental	53	0.8	84.9
Nonpsychiatric	3,840	60.0	29.3
Total	6,407	100	53.2

Length of service also affected the likelihood of attrition differentially for the two diagnostic categories. Six-month attrition after a hospitalization that occurred during the first 30 days,

1–3 months, and 3–6 months of service was 93.8%, 93.1%, and 81.1%, respectively, for psychiatric conditions compared with 49.5%, 26.6%, and 16.7% for nonpsychiatric conditions.

Table 1.16 shows unadjusted and adjusted odds ratios from multiple logistic regression modeling of 6-month attrition. Service, gender, age, and race were statistically significant in the final model. The adjusted odds ratio for all psychiatric conditions was 18.7 (95% CI 16.2, 21.5).

TABLE 1.16. MULTIPLE LOGISTIC REGRESSION MODEL FOR 6-MONTH ATTRITION

Variable*	Unadjusted		Adjusted	
	Odds ratio	95% CI	Odds ratio	95% CI
All psychiatric	19.5	16.9, 22.5	18.7	16.2, 21.5
Female	1.5	1.3, 1.7	1.4	1.2, 1.6
Air Force	2.1	1.9, 2.5	1.4	1.2, 1.6
Black	0.7	0.7, 0.8	0.7	0.6, 0.8
Other race	0.7	0.6, 0.8	0.6	0.5, 0.8
Age >20 years	1.2	1.1, 1.3	1.2	1.1, 1.4
Single marital status	0.9	0.7, 1.1	NS	
Less than HS	0.7	0.6, 0.9	NS	

*Reference groups are, respectively, nonpsychiatric diagnosis, male, not Air Force, white, age <20 years, nonsingle marital status (married, divorced, other), and at least a high school education ($p > 0.05$).

Figure 1.7 shows Kaplan-Meier 6-month survival estimates after hospitalization for nonpsychiatric and psychiatric diagnostic categories. The survival likelihood is highest for nonpsychiatric conditions, followed by alcohol and substance disorder. The seven other psychiatric categories have the lowest subsequent survival likelihood but are similar to each other as evidenced by overlapping curves. The difference in survival likelihood is apparent within the first 60 days after hospitalization as evidenced by the divergent curves. At 90 days, the survival proportion is approximately 80% for nonpsychiatric, 50% for alcohol and substance disorder, and <25% for all other psychiatric conditions. The slope of the curves for these three groups is parallel after 80 days because few discharges occur after this time.

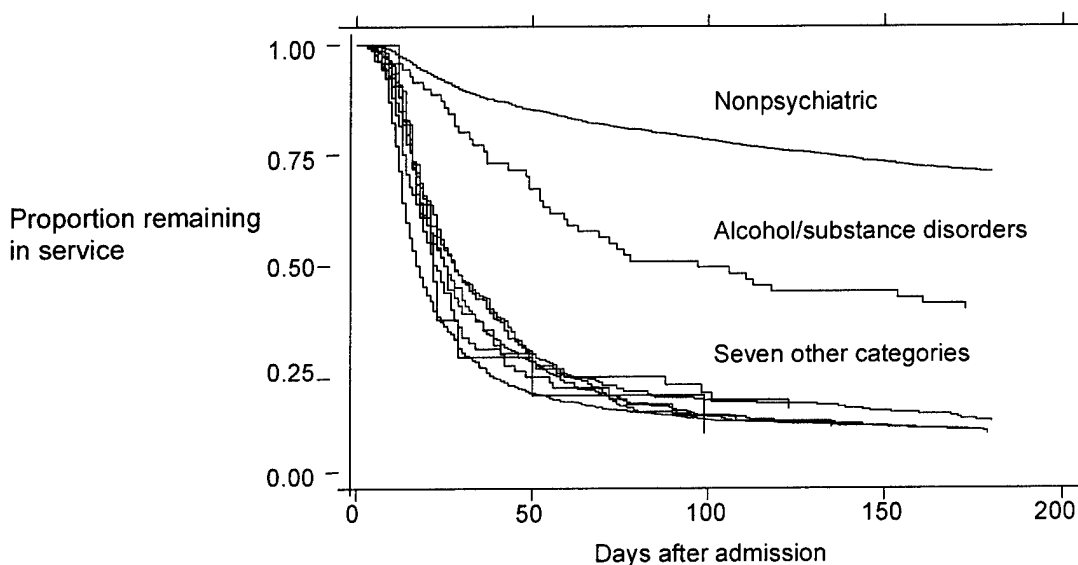


FIGURE 1.7. KAPLAN-MEIER SURVIVAL ESTIMATES OVER FIRST 6 MONTHS AFTER HOSPITALIZATION FOR PSYCHIATRIC (ALCOHOL AND SUBSTANCE DISORDER AND OTHER PSYCHIATRIC) VS NONPSYCHIATRIC HOSPITALIZATION DIAGNOSES.

Figure 1.8 shows the reasons given for discharge among those discharged within 6 months of hospitalization by diagnostic category of the hospitalization. The percentage of discharges attributed to “failure to meet medical standards” was 1% after hospitalization for adjustment disorder, 6% after “other psychiatric” hospitalization, and 14% for nonpsychiatric conditions. The percentage of discharges attributed to failure to meet minimum behavioral and performance standards was 97% after hospitalization for adjustment disorder, 75% after other psychiatric hospitalizations, and 58% after hospitalizations for nonpsychiatric conditions.

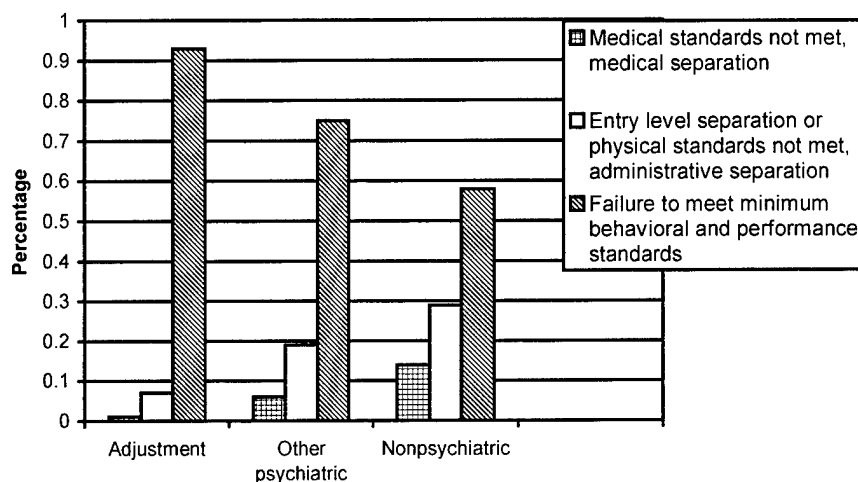


FIGURE 1.8. DISCHARGE PERCENTAGE BY DIAGNOSIS (ADJUSTMENT VS OTHER PSYCHIATRIC DISORDERS VS NONPSYCHIATRIC CONDITIONS) AND ISC.

Discussion

This study of 303,433 accessions from 1999 through 2000 identified 6,527 (2.2%) who were hospitalized. Approximately 40.1% of all hospitalizations were for psychiatric conditions. Females, whites, and Air Force personnel were overrepresented in psychiatric hospitalizations, although reasons for these observations were not established.

The all-cause hospitalization rate observed was 20.3 per 1,000 person-years. The study was restricted to the first 6 months of service, which usually includes basic and advanced individual entry training. The length of training varies by service and occupational specialty. In general, trainees are exposed to both physically and mentally challenging schedules. During this period they usually live in group housing and have ready access to medical care.

The most common specific psychiatric condition was adjustment disorders, with 11.7 cases per 1,000 person-years and 23% of all admissions. Adjustment disorder is an axis I Diagnostic and Statistical Manual IV diagnosis that is generally not reimbursable by third party insurance, and individuals are usually treated as outpatients in the civilian health care sector. Consequently, records are less accessible.

Adjustment disorder is not a cause for disqualification according to DoD Instruction 6130.4 or medical separation by Army Regulation 40-501. In most cases, the indication for

admission is perceived risk of injury to self or others, although risk of injury is not captured by an ICD9 code.

The 6-month attrition percentage was approximately 90% for each psychiatric category except alcohol and substance disorder (61.4%). Alcohol and substance disorder appears to be preferentially retained on active duty because of the condition's prevalence in the general population and the potential for rehabilitation and monitoring in the structured military environment.

Psychiatric hospitalization was three times more likely than nonpsychiatric hospitalization to result in attrition within 6 months. Survival estimates revealed that after excluding alcohol and substance disorders, individuals hospitalized for psychiatric conditions had a <20% chance of being retained for 6 months after hospitalization. This compares with over 80% retention at 6 months after hospitalization for nonpsychiatric conditions. In addition, most of this difference was apparent soon after hospitalization (i.e., in the first 60 days).

Most discharges of individuals hospitalized for psychiatric conditions were categorized as being for administrative reasons, such as failure to meet minimum behavioral and performance criteria, rather than as resulting from a pre-existing medical condition. There may be several reasons for such characterizations. First, administrative discharges are relatively easy to process compared with medical discharges, which require documentation of the presence and duration of the condition. In addition, the stress of military service is most likely unprecedented in the lives of recruits, so a history of adjustment disorder is often not recognized. Finally, psychiatric conditions, including adjustment disorders, may generally be viewed as chronic conditions not compatible with military service.

This study has several limitations. It is based on administrative databases only. Medical records were not reviewed, so accuracy of diagnoses could not be confirmed. Likewise, completeness of reporting of diagnoses could not be evaluated, although hospitalization reporting by medical treatment facilities to PASBA has been fairly complete. Hospitalization records likely underestimate the burden of disease caused by mental health disorders. Large numbers of cases, particularly those without risk of injury to self or others, are treated as outpatients. Ambulatory data sources are available but were not included because, in general, they are considered less accurate than hospitalization sources. Servicemembers with mental health disorders may be discharged for administrative reasons before receiving a mental health evaluation and diagnosis. Finally, no data were obtained regarding the reason for hospital admission, e.g., risk of injury.

Conclusions

Mental health disorders are the leading cause of hospitalization in the first 6 months of service and are strongly predictive of subsequent near-term attrition, with a 6-month attrition percentage of 90%. Most separations are not medical but administrative. Adjustment disorders are the most common psychiatric condition.

Future studies are needed to improve the screening for preexisting psychiatric conditions in applicants. A systematic health assessment of recruits might allow for the development of interventions to minimize the impact of the stress of military life on at-risk populations, e.g., individuals with poor coping mechanisms, a history of physical abuse, or a history of

substance abuse. Finally, the prognosis of servicemembers hospitalized for adjustment disorder should be studied.

Acknowledgments

AMSARA acknowledges LTC Jeffrey Kingsbury for preparing this analysis.

References

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EFFECTS OF ATTRITION PREDICTORS ACCORDING TO THE MEPS THROUGH WHICH AN INDIVIDUAL IS PROCESSED: META-ANALYSIS ON ATTRITION

Introduction and Methods

Each year more than 200,000 individuals appear at the MEPS to apply for enlisted service. Of these applicants, about 50–60% are admitted and subsequently begin active duty. About one-third of the first-term enlistees in each of the services fail to complete their initial enlistment terms (“Attrition Rate for Enlistees Waived for Medical Disqualification Conditions”, 2000 AMSARA Annual Report). The highest attrition rate occurs in the first 6 months of service, when over 10% of the entering cohort is discharged.

Attrition rates also vary among the MEPS, with the highest rate being more than double that of the lowest. Because the MEPS are geographically spread across the United States, the demographic profiles of the recruits somewhat reflect the different demographics of regional populations. In fact, each MEPS may simply be a surrogate for the location of the individual’s upbringing.

A natural question is whether these demographic factors represent the same attrition risks regardless of the MEPS through which the applicants are processed. Accordingly, an initial attrition model examined the effects of the individual variables and the attrition rates across the MEPS for homogeneity. A second-level regression is then used to study the effects of these variables according to their overall distributions at the various MEPS. For example, the model will help assess whether the effect of being male is the same across MEPS with different percentages of male applicants. Finally, all MEPS variables that show significance and interactions in the second-level model will be controlled in an overall attrition model.

Results

Homogeneity of Attrition Rate Across MEPS

Table 1.17 shows the mean 6-month attrition rates for each service among all recruits, as well as results of homogeneity testing of these rates among recruits who had been processed at each of the 65 MEPS. The chi-square test values are large for each service ($p < 0.0001$), meaning that the likelihood of early attrition differs according to the MEPS through which an individual is processed.

**TABLE 1.17. HOMOGENEITY TEST:
6-MONTH ATTRITION RATES ACROSS ALL 65 MEPS (DF = 64)**

	Army	Navy	Marines	Air Force
Weighted attrition rate	0.157	0.171	0.130	0.130
SE	0.001	0.001	0.001	0.001
Chi-square	695	812	620	520

Table 1.18 examines by service whether the effects of several variables on likelihood of attrition are similar across all MEPS. Except for the Air Force, each service has several

factors that exert significantly differing effects on attrition likelihood according to the MEPS through which applicants are processed. For example, the first two rows of Table 1.18 indicate that the effects of gender and age on attrition likelihood in the Army and Navy differ according to the MEPS.

TABLE 1.18. HOMOGENEITY STATISTIC (Q) OF INDIVIDUAL FACTOR EFFECTS ACROSS MEPS

Factor	Army		Navy		Marines		Air Force	
	Q	p	Q	p	Q	p	Q	p
Gender	131.9	0.00	100.7	0.00	81.8	0.07	68.9	0.31
Age	92.5	0.01	91.0	0.02	77.1	0.13	76.4	0.14
Black	73.7	0.19	165.9	0.00	94.8	0.01	58.2	0.68
White	77.8	0.12	201.1	0.00	73.9	0.19	69.1	0.31
Dependents	75.3	0.16	0	1.00	55.4	0.77	45.1	0.97
Less than HS	59.4	0.64	89.2	0.02	34.4	1.00	18.5	1.00
AFQT	146.1	0.00	121.1	0.00	92.7	0.01	86.2	0.03
Single	60.4	0.60	0.2	1.00	64.8	0.45	36.2	1.00
Married	61.3	0.57			68.5	0.33	34.8	1.00
Overweight	87.9	0.03	82.4	0.06	67.3	0.37	67.1	0.37
Underweight	88.1	0.03	77	0.13	87.3	0.03	70.3	0.28
Temporary disqualification	44.6	0.97	55.2	0.77	82.2	0.06	61.9	0.55
Permanent disqualification	68.8	0.32	50.2	0.90	64.3	0.47	60.8	0.59

*Values in red represent factors that exerted differing effects across the MEPS.

For each factor with effects that differed across the MEPS, a hierarchical linear regression model was applied at the MEPS level (i.e., 65 observations were made, one for each MEPS). The dependent variable was the effect of the factor, and the independent variables were the levels of the other predictors by MEPS. For example, the effect of being male on likelihood of attrition may depend on the percentage of applicants to that MEPS who are male or to the percentage of male applicants who actually proceed to active duty, or to any combination of other factors.

After developing the necessary hierarchical models, the individual-level attrition model was rebuilt by substituting the hierarchical models for the individual factors, where appropriate. For example, where the effect of gender on likelihood of attrition was found to vary across the MEPS, the gender term in the final model was replaced with its hierarchical modeling. In this way, AMSARA developed a mixed model to predict the attrition rates for every MEPS based on the individual and group characteristics of applicants processed through that MEPS.

Model after Including MEPS Terms

Three forms of the AMSARA attrition models were performed and compared:

- Model 1: initial Cox proportional hazards model;
- Model 2: model 1, with the heterogeneous attrition factors replaced by the MEPS regressions found in Table 1.2;
- Model 3: model 2, with significant interaction terms included.

Each model had highly significant power in predicting attrition. For each service, however, model 2 outperformed model 1, meaning that the replacement of heterogeneous attrition factors by their MEPS-level regressions significantly improves model performance. Further, for each service, model 3 outperformed model 2; i.e., the allowance of interaction terms in the hierarchical model significantly improves model performance.

Effects of Medically Related Variables

Four medically related variables were considered in this analysis: permanent medical disqualification, temporary medical disqualification, overweight at time of application, and underweight at time of application. These variables had homogeneous effects on attrition across the MEPS (Table 1.18).

Table 1.19 shows the estimated relative risks of discharge within 6 months for each medically related variable from each of the three models. The relative risks of discharge for either temporary or permanent medical disqualification within any service are almost the same in all three models. For example, the risk of discharge from the Army within 6 months for an individual with a permanent medical disqualification relative to one without is 1.27. The analogous risk is 1.15–1.17 for those in the Navy and Marines, and 1.12 for those in the Air Force. The relative risk associated with being underweight was similar for all services, ranging from 1.07 to 1.15. The relative risk associated with being overweight ranged from 1.02 to 1.12 among the Navy, Marines, and Air Force, whereas the risk in the Army varied considerably depending on the MEPS.

TABLE 1.19. RELATIVE RISKS OF DISCHARGE WITHIN 6 MONTHS FOR MEDICALLY RELATED VARIABLES

Service	Medical disqualification (permanent)	Temporary disqualification	Underweight	Overweight
Army				
Model 1	1.267	1.233	1.115	1.155
Model 2	1.267	1.231	1.113	1.156
Model 3	1.256	1.233	1.175	*
Navy				
Model 1	1.157	1.269	1.073	1.019
Model 2	1.145	1.262	1.071	1.02
Model 3	1.147	1.26	1.071	1.02
Marines				
Model 1	1.181	1.6	1.154	1.117
Model 2	1.174	1.595	1.150	1.115
Model 3	1.175	1.595	1.150	1.115
Air Force				
Model 1	1.129	1.17	1.076	1.037
Model 2	1.121	1.168	1.078	1.037
Model 3	1.121	1.169	1.078	1.037

*Varies by MEPS.

Comparison of Adjusted with Actual Attrition by MEPS

Using the hierarchical model, AMSARA derived adjusted attrition rates for individual MEPS based on the demographic factors of all applicants and of those who accessed. Table 1.20

shows summary results by service for those MEPS whose recruits had significantly higher 6-month attrition than expected after adjustment. Six Army MEPS, 11 Navy MEPS, two Marine MEPS, and no Air Force MEPS had significantly high attrition rates. Note that the recruits processed through these MEPS did not necessarily have higher attrition than those from other MEPS, but their attrition was higher than expected given demographic and other features. Note that because only one MEPS showed a significantly higher than expected attrition rate for more than one service, there is little or no appearance of any systematic attrition issues with any particular MEPS.

The total gained enlistees in the MEPS shown in Table 1.20 was 13,050 per year, about 17% (2,277) of whom were discharged within 6 months. Among those discharged, about 12% (268) were “extra” losses beyond what would have been expected based on the features of those recruits.

TABLE 1.20. GAINS AND LOSSES AMONG MEPS WITH HIGH ATTRITION

Service	No. of MEPS with high attrition	Average no. of enlistees gained per year	Loss within 6 month		
			Actual	Expected	Extra*
Army	6	4,100	680	617	63
Navy	11	8,600	1,533	1,344	189
Marines	2	350	64	48	16
Total	19	13,050	2,277	2,009	268

* Number of actual losses beyond what was expected based on modeling (Actual – Expected = Extra)

Discussion

Hierarchical modeling of heterogeneous attrition factors against features of both the applicant population and subsequent accession population was introduced to account for the heterogeneous effects of predictive factors. Attrition likelihood had been seen to differ according to the MEPS, and the modeling has shown that much of this difference is attributable to different features of the applicants passing through the various MEPS.

It was reassuring to see that the effect of medical disqualification (temporary or permanent) on attrition likelihood was consistent across the MEPS. This consistency indicates that the medical disqualification process, in conjunction with the medical waiver process, results in a fairly uniform application of the medical standards no matter where an applicant is examined. Unfortunately, the likelihood of attrition among those who were initially disqualified is somewhat higher than among those who were not disqualified.

CASE SERIES REVIEW OF RECRUITS DISCHARGED FOR HEARING LOSS IN 1998–2000

Introduction

A hearing loss at the threshold level described in DoD Directive 6130.3 (E1.5.1.3) causes rejection for enlistment. A recruit with preexisting hearing deficit is more likely to have progressive noise-induced hearing loss (NIHL). Servicemembers who cannot hear adequately may be putting themselves and others at risk, particularly in combat. Effective screening that identifies and disqualifies applicants with preexisting hearing loss may be lead to fewer servicemembers with NIHL.

Methods

A retrospective descriptive analysis was conducted for all recruits receiving an EPTS discharge for hearing loss reported to MEPCOM from 1998 through 2000. Hearing loss discharges were identified by ICD9 code 389. All available EPTS discharge records (SF 600, DA 4707, or DA 3947 and supplementary records depending on service) were reviewed to verify computer data entry and recruit awareness of the disorder and to describe presenting symptoms. Records (SF88 and SF93) from the initial MEPS physical exam were also reviewed for history of hearing loss.

Service, gender, age, race, education level, AFQT, and basic training location were described and compared with the general recruit accession population. Service-specific waiver databases were queried to determine the number of EPTS discharges among those entering the service with a waiver for hearing loss.

In most instances, etiology for hearing loss was difficult to determine. A modified version of the NIHL criteria [1] was used to classify recruits. A case was characterized as NIHL if his or her audiogram met both these criteria in at least one ear:

1. Threshold values at 500 and 1,000 Hz are <15 dB.
2. Threshold values at 3,000, 4,000, and 6,000 Hz are at least 15 dB higher (worse) than highest (worst) threshold value for 500 and 1,000 Hz [1].

All other cases of hearing loss were classified as non-NIHL.

Results

During the 3 years studied, 262 EPTS discharges for hearing loss were reported to MEPCOM. Of these, 240 medical records (91.6%) were available for review. The median age of 19 (range: 17–37 years) was not significantly different from the general accession population (Table 1.21). Males were three times more likely to be discharged for hearing loss than females ($p < 0.01$).

Those receiving EPTS discharges for hearing loss were not representative of the general recruit population. They were twice as likely to be white, and they had lower AFQT scores. Recruits who had not graduated from high school at the date of the MEPS exam were 7.5 times more likely to be discharged for hearing loss than recruits with a high school education ($p < 0.01$).

TABLE 1.21. DEMOGRAPHICS OF RECRUITS WHO RECEIVED AN EPTS DISCHARGE FOR HEARING LOSS AND GENERAL RECRUIT ACCESSION POPULATION IN 1998–2000

Characteristic	% EPTS hearing loss (n = 242)	% Recruits accessed (n = 525,609)	Odds ratio	95% CI
Age				
17–20 yr	67.5	69.5	1	
21–25 yr	25.8	24.5	1.09	0.80, 1.47
26–30 yr	5.4	4.7	1.18	0.64, 2.13
>30 yr	1.3	1.2	1.05	0.27, 3.38
Gender				
Male	93.3	81.6	1	
Female	6.7	18.4	0.32	0.18, 0.54
Race				
White	76.3	69.9	1	
Black	10.0	19.5	0.47	0.30, 0.73
Other	12.9	10.6	1.15	0.78, 1.70
AFQT score				
93–99	0.5	4.0	0.16	0.01, 1.05
65–92	24.1	33.9	1	
50–64	28.2	28.6	1.39	0.95, 2.03
31–49	44.5	32.1	1.95	1.38, 2.77
1–30	2.7	1.3	2.99	1.16, 7.23
Education level				
Less than HS	32.5	6.1	7.48	5.61, 9.96
HS diploma	66.5	89.6	1	
Some college	1.0	4.3	0.28	0.05, 1.14

MEPS audiograms were available for 222 of 239 (92.9%) EPTS cases. Both ears were affected in 95 (42.8%) cases. In cases of unilateral hearing loss, the left ear was nearly three times more likely to be affected than the right (93 [41.9%] and 34 [15.3%], respectively). High-frequency deficit was the most common condition, accounting for 101 discharges (45.7%), followed by pan-frequency hearing loss in 76 (34.4%), mid-to-high frequency loss in 21 (9.5%), and low-to-mid frequency loss in 23 cases (10.4%). Some 59.6% had NIHL hearing loss according to the modified definition described under “Methods,” and 32.1% had other reasons for the hearing loss. No reason could be determined for 8.3% of the records (Table 1.22).

TABLE 1.22. HEARING LOSS ETIOLOGY DETERMINED BY PREDETERMINED CRITERIA AND REVIEW OF MEDICAL RECORDS (N = 239)

Etiology	No.	%
NIHL	142	59.6
Non-NIHL but no known secondary cause	40	16.7
Tympanic membrane perforation	17	7.1
Congenital	8	3.3
History of mastoidectomy	3	1.3
Trauma	3	1.3
Recurrent otitis media	2	0.8
Otosclerosis	2	0.8
Dehiscence of jugular bulb	1	0.4
History of labyrinthitis	1	0.4
Unclear	20	8.3

Location of the preaccession exam for each recruit receiving a discharge for hearing loss was noted; 59 of 65 MEPS were represented.

Nearly half the reported discharges for pre-existing hearing loss were Marines, although Marines constitute the smallest percentage of recruits accessed (Table 1.23). Both Marines training sites conduct universal audiometric screening, as does the Navy site. For the Army, the great majority (60/72) of reported discharges for pre-existing hearing loss were from Fort Sill. As this training site's focus is on heavy artillery, Fort Sill is the only Army training site conducting universal audiometric screening during inprocessing. The very low number of hearing EPTS for the Air Force is reflective, at least in part, of a general lack of EPTS reporting by the Air Force over the time period examined. More generally, it is worth noting that EPTS discharge reporting rates have varied considerably by service, and by training site within a service, so observed contributions by service and site may reflect reporting disparities rather than actual differences in hearing low frequency.

TABLE 1.23. EPTS HEARING LOSS DISCHARGES BY SERVICE AND BASIC TRAINING SITE IN 1998–2000 (N = 236)

Basic training site*	EPTS hearing loss cases		Active duty recruits accessed	
	No.	%	No.	%
Army	72	30.5	194,103	38.0
Fort Benning	5		40,207	
Fort Jackson	4		54,434	
Fort Knox	1		20,082	
Fort Leonard Wood	2		28,355	
Fort Sill	60		21,124	
Air Force				
Lackland AFB	3	1.3	98,973	18.5
Marines	109	46.2	93,784	18.2
Parris Island	13		46,153	
San Diego	96		45,311	
Navy				
Great Lakes	52	22.0	138,749	25.3

* Coast Guard not included.

When all EPTS discharges were classified by the modified MEPCOM coding system, it appeared that 18 (7.5%) should have been discovered at MEPS and disqualified. Eighty-five (35.4%) clearly had abnormal audiograms but still met accession standards; 50 (20.8%) initially had failing MEPS audiograms, but these exams were repeated and the recruit then met accession standards. Twenty-five (10.4%) records could not be coded. Surprisingly, nine (3.8%) were determined to be concealing their condition. Fifty-three (22.1%) records reported the recruits had waivers; however, the service-specific waiver authority databases indicated that only 32 of the 53 recruits were actually granted waivers for hearing loss. This discrepancy cannot be explained from the records available.

Discussion

Although applicants are routinely screened for hearing loss at MEPS, approximately 80 recruits receive EPTS discharges for hearing loss every year. Those that receive EPTS discharges are more likely to be male and white, which is consistent with the reported prevalence of hearing loss in the medical literature. Recruits given an EPTS discharge for

hearing loss had a lower level of education and lower AFQT score, consistent with the findings of previous studies [2].

A large proportion of recruits who had EPTS discharges for hearing loss from 1998 through 2000 appeared to meet accession standards for hearing at the MEPS. Among the many possible explanations are poor technique or equipment during screening, subsequent hearing loss (some recruits access up to 1 year after their exam), or lack of reproducibility in audiograms. Over 20% of the study population were given multiple audiograms at MEPS before they “passed.”

Standardizing and automating audiograms at MEPS should be considered. Using a system that is compatible with the Hearing Evaluation Automated Registry System would allow these initial audiograms at MEPS to be the baseline for those immediately entering basic training. Basic training sites could then give repeat audiograms only to the smaller population of recruits who had a gap of at least 6 months since their last audiogram.

Acknowledgments

AMSARA thanks 2LT Kimberly Kehoe, MS4.

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CASE SERIES REVIEW OF RECRUITS DISCHARGED FOR SCOLIOSIS IN 1999–2000

Introduction

Scoliosis is a spinal deformity in which there is a lateral curvature of >10 degrees [1]. DoD Directive 6130.3 states that deviation of the spine is disqualifying for service if any of the following conditions are met:

- Deviation prevents individuals from following a physically active vocation in civilian life.
- Deviation interferes with the wearing of uniforms or military equipment.
- Deviation is symptomatic and associated with positive physical findings and is demonstrable by x-ray.
- Lumbar scoliosis of >20 degrees, thoracic scoliosis of >30 degrees, and/or kyphosis or lordosis of >55 degrees can be measured by the Cobb method.

Scoliosis is present in 2–4% of adolescents, although disqualifying degrees of scoliosis are much less frequent. In the general population, prevalence of curves of >30 degrees is 0.2%; prevalence of >40 degrees is 0.1% [2]. AMSARA has documented that orthopedic problems are consistently one of the three leading reasons for EPTS discharges during initial entry training for all services. Scoliosis accounted for 328 of 14,204 (2.3%) EPTS discharges from 1999 to 2000.

Methods

EPTS discharge records from 1999 and 2000 received by MEPCOM that had a primary or secondary diagnosis of spine curvature (ICD9 code 737) were reviewed. Cases were limited to active duty Army, Navy, Air Force, Marine, and Coast Guard enlistees discharged during calendar years 1999 and 2000.

Results

From 1999 through 2000, MEPCOM received EPTS discharge records for scoliosis on 328 recruits; 205 had a primary diagnosis of scoliosis and 53 had a secondary diagnosis. Seventy other spinal curvature and non-scoliosis cases were excluded on further review for the following diagnoses: kyphosis (50), lordosis (4), other orthopedic (1), or back (15).

Demographic characteristics of the reported scoliosis cases are presented compared with recruit accessions in 1999–2000 in Table 1.24. In the study population, individuals aged 17–21 years, female, and serving in the Army are overrepresented compared with the total accession population. Differences in scoliosis cases by service may more reflect differences in EPTS discharge reporting than actual number of cases.

TABLE 1.24. DEMOGRAPHIC DISTRIBUTION OF EPTS SCOLIOSIS DISCHARGES AND GENERAL ACCESSION POPULATION IN 1999–2000

Demographics	EPTS cases (<i>n</i> = 258)		% Accessions (<i>n</i> = 360,080)
	No.	%	
Age*			
17–21 yr	196	78.1	69.2
22–25 yr	38	15.1	25.4
>25 yr	17	6.8	5.4
Missing	7		
Gender			
Male	197	77.6	81.5
Female	57	22.4	18.5
Missing	4		
Service			
Army	158	62.0	36.9
Air Force	13	5.1	17.8
Navy	66	25.9	26.4
Marines	18	7.1	18.8
Coast Guard	3		†

* On date of MEPS exam.

† Coast Guard accessions unavailable from DMDC.

All records stated that a radiological study had been completed, but only 175 of 254 (68.9%) cases, excluding four records with missing gender, had Cobb angles documented (Table 1.25). Those with angles of <10 degrees (not considered scoliosis) were misclassified. Angles between 10 degrees and 19 degrees meet the definition of scoliosis but are neither clinically significant nor disqualifying. Therefore, 64 of 133 (48.1%) males and 27 of 42 (64.2%) females received EPTS discharges for scoliosis that most likely should have been classified as low back pain. The most frequent comorbidity reported was low back pain (17.1%).

TABLE 1.25. COBB ANGLE SUMMARY OF SCOLIOSIS CASES BY GENDER*

Total analyzed (<i>n</i> = 254)	Males (<i>n</i> = 197)		Females (<i>n</i> = 57)	
	No.	%	No.	%
<10 degrees, not scoliosis	19	14.3	8	19.0
≥10–19 degrees, not within DoD criteria for EPTS discharge	45	33.8	19	45.2
≥20–29 degrees	42	31.5	4	9.5
≥30–49 degrees, increased risk of curve progression	26	19.5	11	26.2
≥50 degrees, increased low back pain	1	0.7	0	0.0
Total with angle reported	133	67.5	42	73.7
Total with angle missing	64	32.5	15	26.3

*Coast Guard numbers not included.

Table 1.26 summarizes the findings of the 259 scoliosis cases in which the current standard, the Adams test, was used to screen for scoliosis. The accession standards state that lumbar scoliosis should be ≥ 20 degrees and thoracic scoliosis should be ≥ 30 degrees for disqualification. The distribution of cases with an x-ray report and those with <20 degrees of Cobb angle curvature by service is also shown. An x-ray report was not included in 32.2%, and the Cobb angle reported was <20 degrees in 64.7% of all cases reviewed.

TABLE 1.26. EPTS SCOLIOSIS DISCHARGE BY SERVICE AND PRESENCE OF X-RAY REPORT AND COBB ANGLE OF <20 DEGREES

Service	X-ray report included		Cobb angle <20 degrees	
	No.	%	No.	%
Army ($n = 158$)	139	88.0	60	38.0
Air Force ($n = 13$)	13	100.0	6	46.2
Marines ($n = 18$)	13	72.2	3	16.7
Navy ($n = 66$)	47	71.1	22	33.3
Coast Guard ($n = 3$)	2	66.7	0	0.0
Total ($n = 258$)	175	67.8	91	35.3

Discussion

This review identified inconsistencies in clinical evaluation and diagnostic criteria of scoliosis. Some 15% (27/175) of the records where a Cobb angle was reported demonstrated that recruits discharged did not meet the clinical criteria for scoliosis. An additional 37% (64/175) did not have a disqualifying level of scoliosis.

Only 22% (38/175) of discharged recruits clearly had disqualifying scoliosis (by reported Cobb angle of ≥ 30 degrees); another 26% (46/175) may have had disqualifying scoliosis if the reported curvature of >20 degrees was in the lumbar region.

This review is limited by the lack of standardization, unreported Cobb angles, and underreporting of cases to MEPCOM. Applicants who receive a waiver for scoliosis should be studied to determine how well they perform on active duty. If the number disqualified at MEPS by the Adams flexion test far exceeds the true burden of scoliosis among applicants, a more specific test for scoliosis should be considered.

Acknowledgments

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2. DESCRIPTIVE STATISTICS IRRESPECTIVE OF ACCESSION RECORDS

Historically, AMSARA summary statistics included only those individuals for which a corresponding accession record could be identified. This restriction, retained for the results in Section 4, allows analyses of individuals known to have begun enlisted active duty from January 1996 to the present. These analyses can be performed according to demographic factors contained in the accession data (e.g., gender, age, race) and also according to length of time in service.

However, AMSARA does not have an accession record for all new accessions; AMSARA has records for regular active duty enlistees who began service from January 1995 to the present but does not have records for officers, reserves, or National Guard. Consequently, information on the raw numbers of hospitalizations, EPTS discharges, and disability discharges irrespective of accession records is presented.

For hospitalizations and disability discharges, the lack of a corresponding accession record for an active duty enlistee may mean that the gain record should be available but is missing or may mean simply that the individual was gained onto active duty before January 1995. For EPTS discharges among active duty enlistees, the lack of corresponding gain records generally indicates a missing record that should be available, because EPTS discharges can only occur within 180 days of initial accession onto duty.

Applicants: Enlistees Only, Reserves and National Guard Only

Reserve and National Guard applicants who received a medical examination at a MEPS in CY 1996–2000 (aggregate) and 2001 are summarized. Although individuals were primarily civilians, many new accessions into the reserves and guard are direct accessions from active duty and are not included in the results. Numbers represent only those applicants receiving a medical examination.

Tables 2.1–2.7 describe applicants to the enlisted reserves. Table 2.1 shows the number of applicants to the reserves who received a medical exam at MEPS. For the Navy, numbers decreased steadily and significantly from 1996 to 2001. Although AMSARA has no access to alternative sources of information on reserve applications in the Navy, this decrease appears to be caused by data difficulties rather than to be an actual trend in applications.

TABLE 2.1. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2001: SERVICE

Year	Army	Navy	Marines	Air Force
1996	26,283	8,918	8,780	2,064
1997	21,639	6,447	7,859	2,092
1998	19,240	3,531	7,234	1,546
1999	21,661	2,194	7,206	2,032
2000	27,018	2,133	7,856	2,578
2001	23,070	1,844	7,501	3,120
Total	138,911	25,067	46,436	13,432

Tables 2.2–2.6 show distributions of applicants to the Army, Navy, Marine, and Air Force reserves in 1996–2000 and 2001. Applicants in 2001 were similar to those in earlier years with respect to gender, age, and education level, but they were somewhat different with respect to race and AFQT scores.

TABLE 2.2. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: GENDER

Gender	1996–2000 Applicants	%	2001 Applicants	%
Female	49,226	26.1	9,428	26.5
Male	139,078	73.9	26,107	73.5

TABLE 2.3. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: AGE

Age	1996–2000 Applicants	%	2001 Applicants	%
17–20 yr	133,717	71.0	25,658	72.2
21–25 yr	30,236	16.1	5,804	16.3
26–30 yr	13,587	7.2	2,439	6.9
>30 yr	10,771	5.7	1,634	4.6

TABLE 2.4. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: RACE

Race	1996–2000 Applicants	%	2001 Applicants	%
White	124,092	65.9	24,791	69.8
Black	42,649	22.6	7,411	20.9
Other	21,256	11.3	3,292	9.3

TABLE 2.5. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: EDUCATION LEVEL

Education level at examination	1996–2000 Applicants	%	2001 Applicants	%
Below HS senior*	22,607	12.0	3,921	11.0
HS senior	48,669	25.8	9,472	26.7
HS diploma	107,291	57.0	20,076	56.5
>HS diploma	2,133	1.1	,464	1.3
Bachelor and above	7,546	4.0	1,563	4.4

*Encompasses the following: 1) those pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc; 2) those not attending high school and who are neither a high school graduate nor an alternative high school credential holder; 3) one who is attending high school and is not yet a senior.

TABLE 2.6. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: AFQT SCORE

AFQT	1996–2000 Applicants	%	2001 Applicants	%
93–99	11,564	6.1	2,571	7.2
65–92	65,575	34.8	13,379	37.7
50–64	46,305	24.6	8,642	24.3
31–49	54,547	29.0	9,623	27.1
1–30	5,430	2.9	854	2.4
Missing	4890	2.6	466	1.3

Table 2.7 compares the disqualification status of the reserve applicants who received a medical exam in 1996–2000 with those examined in 2001. It is seen that for both periods, over 80% of the applicants were free of medical disqualification, either permanent or temporary. Moreover, the applicants in 2001 had slightly lower percentages of both permanent and temporary medical disqualifications compared with those in 1996–2000.

Table 2.7. RESERVE APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: MEDICAL DISQUALIFICATIONS

Medical disqualification	1996–2000		2001	
	Count	%	Count	%
None	151,640	80.5	29,222	82.2
Permanent	15,797	8.4	2,889	8.1
Temporary	20,874	11.1	3,424	9.6

Tables 2.8–2.13 summarize the demographics of Army and Air National Guard applicants who received a MEPS medical examination during 1996–2000 and 2001. Table 2.8 shows the numbers of applicants to the two National Guard programs by year of medical examination. The numbers are fairly stable for the Army National Guard, but the numbers for the Air National Guard drop in 1998 and 1999.

**TABLE 2.8. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2001: SERVICE**

Year	Army National Guard	Air National Guard
1996	38,251	4,397
1997	34,327	3,972
1998	29,273	2,829
1999	32,164	3,335
2000	37,388	5,027
2001	38,355	5,862
Total	209,758	25,422

Tables 2.9–2.13 compare distributions of applicants to the Army and Air National Guard in 1996–2000 with those in 2001. The 2001 applicants are somewhat different on all demographics from the 1996–2000 pool. The 2001 applicants include a higher percentage of females, are somewhat younger, and have slightly higher AFQT scores.

**TABLE 2.9. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: GENDER**

Gender	1996–2000 Applicants	%	2001 Applicants	%
Female	40,848	21.4	10,327	23.4
Male	150,105	78.6	33,890	76.6

**TABLE 2.10. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: AGE**

Age	1996–2000 Applicants	%	2001 Applicants	%
17–20 yr	131,825	69.0	32,178	72.8
21–25 yr	32,370	17.0	7,406	16.7
26–30 yr	14,740	7.7	2,765	6.3
>30 yr	12,028	6.3	1,868	4.2

**TABLE 2.11. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: RACE**

Race	1996–2000 Applicants	%	2001 Applicants	%
White	145,561	76.2	34,817	78.7
Black	31,099	16.3	6,572	14.9
Other	14,074	7.4	2,805	6.3

**TABLE 2.12. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: EDUCATION LEVEL**

Education level at examination	1996–2000 Applicants	%	2001 Applicants	%
Below HS senior*	30,336	15.9	6,327	14.3
HS senior	43,446	22.8	11,358	25.7
HS	108,610	56.9	24,406	55.2
>HS	2,503	1.3	,639	1.4
Bachelor's and above	5,965	3.1	1,320	3.0

*Encompasses the following three cases: 1) one who is pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc; 2) one who is not attending high school and who is neither a high school graduate nor an alternative high school credential holder; 3) one who is attending high school and is not yet a senior.

**TABLE 2.13. ARMY AND AIR NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: AFQT SCORE**

AFQT	1996–2000 Applicants	%	2001 Applicants	%
93–99	8,836	4.6	2,367	5.4
65–92	56,827	29.8	15,004	33.9
50–64	39,962	20.9	9,727	22.0
31–49	65,872	34.5	14,592	33.0
1–30	7,422	3.9	1,820	4.1
Missing	12,044	6.3	707	1.6

Table 2.14 compares the medical disqualification status of National Guard applicants who received a medical exam during 1996–2000 with those in 2001. For both periods, more than 75% of the applicants were free of either permanent or temporary medical disqualification. Moreover, the 2001 applicants had slightly lower percentages of both permanent and temporary medical disqualifications when compared with those in 1996–2000.

**TABLE 2.14. NATIONAL GUARD APPLICANTS AT MEPS
WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000 VS 2001: DISQUALIFICATION**

Disqualification	1996–2000		2001	
	Count	%	Count	%
None	144,520	75.7	35,271	79.8
Permanent	18,859	9.9	3,605	8.2
Temporary	27,584	14.4	5,341	12.1

Hospitalizations: Enlistees and Officers, All Components

Hospitalizations of service members to any military treatment facility are summarized, regardless of whether AMSARA has an accession record corresponding to the hospitalized individual. Except where explicitly distinguished, the tables include all hospitalizations, regardless of length of time in service before hospitalization.

Table 2.15 shows overall hospitalization counts and percentages during the first and second years of service, as well as counts of hospitalizations at all lengths of service. Results are shown separately for active duty enlistees, officers, and warrant officers during 1996–2001.

It can be seen that a much greater percentage of hospitalizations among enlistees occurs during the first 2 years of service compared with officers or warrant officers. The small percentage for warrant officers reflects the fact that individuals typically must rise through the enlisted ranks to become warrant officers; thus few achieve that level during the first 2 years of service.

The greater influence of the first 2 years among enlistees compared with officers may partly reflect the tendency of enlistees to spend less time in the service than officers, i.e., a greater percentage of the enlistee force consists of individuals in the first 2 years of service. The greater physical demands of basic and advanced individual training may also contribute to this disparity.

**TABLE 2.15. HOSPITALIZATIONS OF ACTIVE DUTY PERSONNEL
BY SERVICE AND GRADE IN 1996–2001**

Grade	Years of service	Army		Navy		Marines		Air Force	
		Count	%	Count	%	Count	%	Count	%
Active duty enlistees	0–1	25,063	13.8	10,124	9.7	6,772	15.3	10,059	12.0
	1–2	24,267	13.4	11,332	10.8	6,960	15.7	7,444	8.9
	All	181,207	—	104,719	—	44,298	—	83,588	—
Officers	0–1	348	2.4	101	1.2	33	1.9	252	2.3
	1–2	661	4.6	273	3.1	77	4.5	410	3.7
	All	14,515	—	8,747	—	1,722	—	11,105	—
Warrant Officers	0–1	7	0.3	0	0.0	1	0.3	2	50.0
	1–2	4	0.2	1	0.2	3	0.9	0	0.0
	All	2,459	—	411	—	339	—	4	—

Hospitalization data on reserves and National Guard were only available for 1999–2001. Table 2.16 shows hospitalizations among the reserves, and Table 2.17 shows hospitalizations for the guard. As with the active duty numbers shown in Table 2.15, it is clear that the percentages of hospitalizations occurring during the first 2 years of service are higher among enlistees than among officers and are much higher than among warrant officers.

TABLE 2.16. HOSPITALIZATIONS IN 1999–2001 BY SERVICE AND GRADE: RESERVES

Years of service	Army		Navy		Marines		Air Force	
	Count	%	Count	%	Count	%	Count	%
Enlistees								
0–1	774	47.1	3	0.8	29	18.7	36	16.7
1–2	79	4.8	15	4.1	13	8.4	6	2.8
All	1,644	—	365	—	155	—	216	—
Officer								
0–1	12	5.4	4	2.7	1	4.8	2	4.5
1–2	10	4.5	5	3.3	4	19.0	3	6.8
All	221	—	150	—	21	—	44	—
Warrant Officer								
0–1	1	4.2	1	100.0	1	100.0	—	—
1–2	0	0.0	0	0.0	0	0.0	0	0.0
All	24	—	1	—	1	—	1	—

TABLE 2.17. HOSPITALIZATIONS IN 1999–2001 BY SERVICE AND GRADE: NATIONAL GUARD

Years of service	Army		Air Force	
	Count	%	Count	%
Enlistees				
0–1	834	44.9	29	10.7
1–2	100	5.4	10	3.7
All	1,859	—	270	—
Officer				
0–1	2	1.5	0	0.0
1–2	3	2.3	0	0.0
All	132	—	36	—
Warrant Officer				
0–1	2	4.3	0	0.0
1–2	0	0.0	0	0.0
All	46	—	0	—

Table 2.18 compares hospitalization percentages during 1996–2000 with those in 2001 among active duty enlistees, officers, and warrant officers by service, according to medical category of the primary diagnosis code. Except for “others,” the categories are taken directly from the ICD9. The “others” category represents a wide range of diagnoses that do not fit the ICD9 categories. In addition, the five categories including the word “other” cover conditions

not fitting the specific categories (e.g., “other diseases of respiratory system” includes all respiratory tract diseases that do not fit into the specific respiratory conditions listed).

In each year and for each service, the largest medical category of hospitalizations (aside from the “others” category) was “complications of pregnancy.” The percentages in this category were considerably higher in 2001 than in 1996–2000 for each service. One possible explanation is that hospitalizations for pregnancy have not followed the trend that has been observed in recent years within other major medical categories toward fewer hospitalizations. In fact, the actual counts of hospitalizations for complications of pregnancy in 2001 were about the same as the annual counts during 1996–2000.

TABLE 2.18. ACTIVE DUTY HOSPITALIZATION PERCENTAGES OF MEDICAL CATEGORIES BY SERVICE

Category	Army		Navy		Marines		Air Force	
	1996–2000	2001	1996–2000	2001	1996–2000	2001	1996–2000	2001
Complications of pregnancy	18.0	21.7	18.3	27.6	11.0	15.2	19.7	27.6
Injuries	9.5	9.5	7.1	7.7	12.6	11.7	7.0	5.5
Neurotic and personality disorders	7.4	9.0	9.4	10.4	8.2	9.8	5.8	10.4
Arthropathies and related symptoms	6.6	5.3	6.2	3.7	8.5	5.7	5.7	2.6
Symptoms	4.2	4.3	4.3	4.9	3.7	5.1	4.1	5.2
Diseases of oral cavity	2.9	3.0	1.6	0.9	1.4	1.4	4.5	3.1
Alcohol and drug dependence	2.7	2.3	3.8	1.7	5.0	2.0	2.6	1.2
Other psychoses	2.6	3.8	3.0	4.1	2.2	3.0	2.1	3.0
Other diseases of respiratory system	1.9	1.0	2.7	1.0	2.6	2.0	2.9	0.9
Hernia of abdominal cavity	1.7	0.9	1.8	0.6	2.9	1.5	1.9	0.3
Appendicitis	1.6	2.0	1.9	2.3	2.4	3.2	2.0	2.8
Other diseases of urinary system	1.5	1.2	1.5	1.2	1.4	0.9	1.8	1.6
Infections of skin and subcutaneous tissue	1.4	2.3	1.8	2.1	3.3	4.1	1.1	1.4
Acute respiratory infections	1.3	1.0	0.4	0.5	0.7	0.8	0.7	0.9
Pneumonia and influenza	1.2	1.9	0.7	1.0	1.6	2.7	0.9	1.4
Noninfectious enteritis and colitis	1.1	0.8	0.8	0.8	0.9	0.8	1.2	1.0
Other diseases due to viruses	1.1	0.7	0.5	0.4	0.7	0.6	2.0	1.1
Poisonings, toxic effects	0.8	0.9	0.5	0.8	1.2	1.9	0.4	0.5
Chronic obstructive pulmonary disease	0.8	0.5	0.4	0.3	0.3	0.4	0.3	0.3
Viral diseases accompanied by exanthem	0.4	0.2	0.3	0.1	0.4	0.4	0.2	0.2
Other bacterial diseases	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Others	31.0	27.6	33.1	27.7	28.9	26.8	32.9	28.8
Total	173,185	24,996	99,532	14,345	39,688	6,671	84,353	10,344

Table 2.19 compares hospitalization percentages during 1996–2000 with those during 2001 among active duty, guard, and reserve members according to medical category of the primary diagnosis code. The comparisons across components for 2001 are similar to those for 1996–2000. However, the distribution of hospitalizations by cause differs considerably by service. In particular, hospitalizations among reserve and guard members tend to be more heavily weighted toward acute conditions than those of active duty members. This may be partly due to the fact that reserve and guard members are only eligible for military hospitalization for conditions that become a problem while on duty. Pregnancy complications, for example, are typically not an eligible cause for hospitalization.

TABLE 2.19. HOSPITALIZATION PERCENTAGES OF MEDICAL CATEGORIES BY COMPONENT: 1999–2001

Category	Active Duty		National Guard		Reserves	
	1999–2000	2001	1999–2000	2001	1999–2000	2001
Complications of pregnancy	22.09	23.53	3.07	3.61	6.88	8.57
Neurotic and personality disorders	9.80	9.70	11.35	5.48	9.47	8.13
Injuries	9.04	8.56	10.22	12.30	9.32	12.64
Arthropathies and related disorders	4.66	4.43	2.70	2.81	3.11	2.86
General symptoms	4.58	4.71	7.46	8.16	8.49	7.47
Other psychoses	3.42	3.63	2.95	3.74	3.83	4.07
Appendicitis	2.30	2.37	2.45	2.01	2.54	2.53
Alcohol and drug dependency	2.14	1.89	1.19	0.80	0.67	1.21
Infections of skin and subcutaneous tissue	1.92	2.27	4.51	4.81	3.05	3.08
Diseases of oral cavity	1.91	2.27	1.19	1.34	0.78	0.99
Other diseases due to viruses	1.69	0.69	3.39	1.34	1.97	1.21
Other diseases of urinary system	1.46	1.25	1.32	1.34	1.24	1.65
Pneumonia and influenza	1.36	1.68	3.82	6.42	3.88	2.31
Other diseases of respiratory system	1.23	1.09	0.88	0.80	1.04	0.88
Noninfectious enteritis and colitis	0.99	0.81	1.25	1.47	1.45	1.10
Acute respiratory infection	0.94	0.83	2.45	1.74	2.07	1.54
Hernia of abdominal cavity	0.90	0.81	1.50	1.74	1.45	0.99
Poisonings, toxic effects	0.79	0.91	0.88	0.40	0.57	0.55
Chronic obstructive pulmonary disease	0.51	0.40	1.00	1.20	0.83	0.22
Viral diseases accompanied by exanthem	0.27	0.18	0.94	0.67	0.93	0.55
Other bacterial diseases	0.25	0.21	0.44	0.27	0.36	0.66
Others	27.75	27.76	35.05	37.57	36.08	36.81
Total	117,310	56,356	1,595	748	1,932	910

EPTS Discharges: Enlistees Only, All Components

Table 2.20 shows the numbers of EPTS discharges by service for active duty reserve and guard applicants. It is clear that with few exceptions the numbers of EPTS discharges are not stable over the time examined for any component in any service. For example, the number of records received for the Navy active duty was <2,200 in 1996, rose to more than twice that number (5,126) in 1998, and then dropped to just over 1,800 in 2001.

The numbers of records received for the Navy reserve were low over the period, with only one record in both 2000 and 2001. Similarly, the numbers of records provided by the Marines fluctuated dramatically for both active duty and reserve members. Finally, the Air Force numbers were fairly stable until 1999, when reporting of EPTS discharges dropped dramatically.

The shortcomings of the EPTS data, including those on reserve and guard members, should be remembered when examining and interpreting EPTS discharge data (see Section 1).

TABLE 2.20. EPTS DISCHARGES BY SERVICE IN 1996–2001*

Service	1996	1997	1998	1999	2000	2001	Total
Army							
Active duty	3,635	3,761	3,648	3,042	3,384	3,094	20,564
Guard	731	847	1,022	775	668	557	4,600
Reserves	229	556	642	456	465	404	2,752
Navy							
Active duty	2,272	3,190	5,126	2,537	1,871	1,821	16,817
Reserves	8	16	22	10	1	1	58
Marines							
Active duty	1,469	1,627	1,409	1,233	1,057	890	7,685
Reserves	64	167	127	101	109	84	652
Air Force†							
Active duty	901	974	1,016	929	203	256	4,279
Guard	7	16	57	34	12	5	131
Reserves	10	24	40	47	8	8	137
Total	9,326	11,178	13,109	9,164	7,778	7,120	57,675

* Data reporting incomplete (see Section 1).

† Air Force didn't provide EPTS discharge records in April 2000–September 2001.

Table 2.21 shows EPTS discharges among active duty enlistees according to the medical categories utilized by MEPCOM. Asthma and orthopedic conditions (i.e., feet, knee, back, other) are major causes of EPTS discharges reported in all services. Psychiatric conditions were the most common causes of EPTS discharges reported for the Navy and Marines: 46.1% and 35.2%, respectively. Note that services differ considerably in how they categorize and report EPTS discharges. Accordingly, differences across services may reflect procedural differences more than true EPTS rates, and any comparisons across services are tenuous, at best.

TABLE 2.21. EPTS DISCHARGES IN 1996–2001 BY CAUSES

Category	Army		Navy		Marines		Air Force*	
	Count	%	Count	%	Count	%	Count	%
Asthma	3,182	15.5	1,983	11.8	730	9.5	855	20.0
Orthopedics—feet	2,851	13.9	443	2.6	406	5.3	509	11.9
Psychiatric—other	2,768	13.5	7,747	46.1	2,707	35.2	88	2.1
Orthopedics—other	2,638	12.8	996	5.9	964	12.5	543	12.7
Orthopedics—knee	2,457	11.9	845	5.0	610	7.9	700	16.4
Orthopedics—back	2,057	10.0	568	3.4	335	4.4	494	11.6
Other	789	3.8	688	4.1	377	4.9	253	5.9
Genitourinary system	750	3.6	490	2.9	153	2.0	107	2.5
Neurology—other	554	2.7	631	3.8	268	3.5	259	6.1
Abdomen and viscera	469	2.3	241	1.4	187	2.4	103	2.4
Vision/refraction	379	1.8	434	2.6	100	1.3	64	1.5
Skin/lymphatics	361	1.8	342	2.0	103	1.3	50	1.2
Cardiovascular—other	341	1.7	289	1.7	150	2.0	81	1.9
Chest/lung—other	273	1.3	128	0.8	97	1.3	49	1.1
Seizure disorder	177	0.9	147	0.9	68	0.9	38	0.9
Eyes—other	175	0.9	327	1.9	84	1.1	44	1.0
Hypertension	130	0.6	99	0.6	67	0.9	8	0.2
Ears—hearing	123	0.6	167	1.0	189	2.5	16	0.4
Schizophrenia	46	0.2	51	0.3	12	0.2	1	0.0
Ears—other	29	0.1	185	1.1	70	0.9	12	0.3
Total	20,564		16,817		7,685		4,274*	

*Air Force did not provide records for discharges in April 2000–September 2001, so the 1996–2001 aggregate numbers for Air Force are underestimates.

The medical causes of EPTS discharges for each service are more thoroughly examined using ICD9 codes listed in DoD Instruction 6130.4. Tables 2.23–2.25 contain primary diagnoses for 1998–2001. (These detailed diagnosis codes are unavailable for previous years.)

Table 2.22 shows the top 20 conditions leading to EPTS discharge in the Army during CY 1998–2001. Asthma, orthopedic conditions, and psychological conditions were the most common conditions underlying the reported EPTS discharges. The number of reported discharges has fluctuated over these years, including a dramatic increase in “neurotic, mood, somatoform, dissociative or factitious disorder.”

Conversely, the numbers of EPTS records listing “allergic manifestations,” “plantar fasciitis,” and “chronic retropatellar knee pain syndrome” as the primary discharge cause declined steadily. Possible reasons for these fluctuations include discharge policy changes, data reporting changes, and random fluctuations in recruit health status.

**TABLE 2.22. TOP 20 PRIMARY EPTS DISCHARGE DOD DIAGNOSES
FOR ACTIVE DUTY REGULAR RECRUITS IN 1998–2001: ARMY**

DoD code	Definition	1998	1999	2000	2001
493	Asthma	572	408	526	565
724	Spine and sacroiliac joints	261	205	178	159
734, 754.6	Flat feet	265	189	253	102
719.4	Disease or chronic pain of lower extremities	253	226	266	233
300	Neurotic, mood, somatoform, dissociative or factitious disorder	150	230	392	465
717.7	Chondromalacia of patella or retropatellar knee pain syndrome	128	114	107	54
728.7	Plantar fascitis	101	52	48	32
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	99	97	109	110
905.4	Lower extremity deformities, injury, weakness, insufficient recovery, disease	77	78	70	62
737	Deviation or curvature of spine	75	56	51	38
784	Headaches, recurrent, all types	73	41	50	49
717.9	Unstable or internally deranged joint	69	45	52	34
732.4	Osgood-Schlatter disease	64	33	42	34
754.5	Clubfoot and pes cavus	61	33	26	22
718.1	Shoulder instability of any major joint	58	50	67	57
345	Epilepsy, including seizures	43	38	35	37
831	Shoulder dislocation	43	35	30	24
313	Behavior disorders	38	41	69	67
995.0	Allergic manifestations	36	8	10	4
786.5	Chest pain	31	21	14	13
	Total	3,648	3,042	3,384	3,094

Table 2.23 shows the top 20 primary conditions leading to EPTS discharge among Navy recruits during 1998–2001. Psychological disorders and asthma lead the list. The numbers of reported discharges are unstable for this 4-year period. In particular, the numbers for CY 1998 are much higher than for the other years for most of the listed conditions. This reflects the overall spike in reported EPTS discharges from the Navy for CY 1998 seen in Table 2.23. A notable exception is for “disease or chronic pain of one or both lower extremities,” which shows a spike in CY 2000.

**TABLE 2.23. TOP 20 PRIMARY EPTS DISCHARGE DoD DIAGNOSES
FOR ACTIVE DUTY REGULAR RECRUITS IN 1998–2001: NAVY**

DoD code	Definition	1998	1999	2000	2001
313	Behavior disorders	810	104	87	100
300	Neurotic, mood, somatoform, dissociative or factitious disorder	732	262	168	109
301	Personality disorders	581	166	130	135
493	Asthma	507	381	206	119
303	Alcohol dependence	303	133	38	15
314	Academic skills defects	169	62	26	21
784	Headaches, recurrent, all types	122	92	48	27
304	Drug dependence	108	75	32	14
305	Alcohol abuse including other nondependent use of drugs	95	39	12	10
307.6	Enuresis up to age 12	95	27	15	24
796	Miscellaneous	73	39	12	14
312	Disturbance of conduct	62	29	27	18
734, 754.6	Flat feet	60	12	16	44
307.4	Sleepwalking	59	11	6	15
724	Spine and sacroiliac joints	56	33	56	47
717.7	Chondromalacia of patella or retropatellar knee pain syndrome	55	53	2	3
367	Vision loss (distant or near acuity)	50	24	10	16
719.4	Disease or chronic pain of lower extremities	48	48	102	132
737	Deviahia or Curvature of spine	46	39	24	27
V22	Pregnancy	45	42	49	57
	Total	5,126	2,537	1,871	1,821

Table 2.24 shows the top conditions leading to EPTS discharge among Marine recruits during 1998–2001. Many of the most common reasons for EPTS discharge among the Marines were psychological. The most common specific condition over the full period was suicide attempt/behavior, although the numbers of records reported for this category declined. Informal review of these records indicated that most were related to behavior rather than actual attempts. Anecdotal evidence suggests that the services take a risk-averse approach to suicide threats, preferring to allow release of all who make such threats rather than risk an actual suicide. This may lead to increased suicide threats by recruits seeking an escape from the rigors of basic training.

The numbers of records changed markedly over this period in certain categories. For example, the numbers of discharges for “alcohol abuse including other nondependent use of drugs” dropped from 39 in 1998 to just three in 2000 and only one in 2001. Similarly precipitous drops in record numbers were seen for “inguinal hernia” and “flat feet” discharges. Further scrutiny would be required to determine the reasons for these dramatic changes in reported discharge numbers.

**TABLE 2.24. TOP 20 PRIMARY EPTS DISCHARGE DOD DIAGNOSES
FOR ACTIVE DUTY REGULAR RECRUITS IN 1998–2001: MARINES**

DoD code	Definition	1998	1999	2000	2001
300.9	Suicide (attempted or suicidal behavior)	251	156	66	89
300	Neurotic, mood, somatoform, dissociative or factitious disorder	169	120	102	129
493	Asthma	126	138	126	156
719.4	Disease or chronic pain of lower extremities	48	51	47	26
784	Headaches, recurrent, all types	45	24	33	20
389	Hearing loss	44	34	33	28
314	Academic skills defects	40	25	14	15
305	Alcohol abuse including other nondependent use of drugs	39	16	3	1
313	Behavior disorders	31	27	12	10
831	Shoulder dislocation	30	29	16	18
301	Personality disorders	27	22	16	20
724	Spine and sacroiliac joints	27	27	37	21
345	Epilepsy (including seizures)	26	14	15	6
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	25	17	26	19
905.4	Lower extremity deformities, injury, weakness, insufficient recovery, disease	23	20	32	16
786.5	Chest pain	17	12	7	13
995.0	Allergic manifestations	17	15	6	12
550	Inguinal hernia	15	9	4	4
717.7	Chondromalacia of patella or chronic retropatellar knee pain syndrome	15	21	38	6
734	Flat feet	15	7	0	0
	Total	1,409	1,233	1,057	890

Table 2.25 shows top 20 primary conditions leading to EPTS discharges among Air Force recruits during 1998–2001. The numbers for 2000–2001 are unreliable because the Air Force provided few data on EPTS discharges in that year. Note that no psychological conditions appear among the leading causes in any year, most likely reflecting a difference in Air Force categorization.

**TABLE 2.25. TOP 20 PRIMARY EPTS DISCHARGE DoD DIAGNOSES
FOR ACTIVE DUTY REGULAR RECRUITS IN 1998–2001: AIR FORCE**

DoD code	Definition	1998	1999	2000*	2001*
493	Asthma	227	184	34	79
719.4	Disease or chronic pain of lower extremities	98	116	10	23
724	Spine and sacroiliac joints	95	101	15	17
784	Headaches, recurrent, all types	54	55	8	7
734	Flat feet	49	2	7	10
717.7	Chondromalacia of patella or chronic retropatellar knee pain syndrome	43	47	7	5
905.2	Upper extremity deformities, injury, weakness, insufficient recovery, disease	32	22	5	1
905.4	Lower extremity deformities, injury, weakness, insufficient recovery, disease	25	13	2	2
718.1	Shoulder instability of any major joint	24	17	4	3
717.9	Unstable or internally deranged joint	17	9		1
070	Viral hepatitis	14	11	4	1
345	Epilepsy, including seizures	13	10	4	1
796	Miscellaneous conditions	12	7	1	1
750.9	Anomaly of upper alimentary tract	11	4	1	2
780.2	Syncope	11	7	4	1
524.6	Disease of jaw or associated tissues	10	16	1	3
550	Inguinal hernia	10	7	4	5
737	Deviation or curvature of spine	10	8	2	4
789.0	Abdominal region pain	10	5	0	2
371.6	Keratoconus	9	2	2	0
	Total	1,016	929	203	257

* Air Force did not provide records for EPTS discharges that occurred in April 2000–September 2001.

Disability Discharges: Enlistees and Officers, All Components

Tables 2.26 and 2.27 show the leading medical categories of all disability discharges occurring in 1996–2001 for the Air Force and Army, respectively. It is seen that “musculoskeletal system, muscle injuries” is the most common cause of disability discharge for both services. However, the percentage differs dramatically by service: 23.2% for the Air Force vs 67.4% for the Army. Diseases of the trachea and bronchi were the second leading cause of disability discharge in both services, accounting for 14.6% of Air Force discharges and 5.0% of Army discharges.

TABLE 2.26. DIAGNOSIS CATEGORIES FOR DISABILITY DISCHARGES IN 1996–2001: AIR FORCE

Diagnosis category	All discharges	%
Musculoskeletal system, muscle injuries	3,312	23.2
Diseases of trachea and bronchi	2,087	14.6
Endocrine system	878	6.2
Heart	638	4.5
Psychotic*, mental organic†, and psychoneurotic§ disorders	605	4.2
Organic diseases of central nervous system	528	3.7
Diseases of genitourinary system	333	2.3
Hemic and lymphatic systems	256	1.8
Systemic condition	245	1.7
Skin	224	1.6
Total	14,255	

* Schizophrenia, bipolar disorder, major depression, paranoid disorders, and psychoses.

† Various dementias.

§ Generalized anxiety disorders; psychogenic amnesia; psychogenic fugue; multiple personality disorder; conversion disorder; psychogenic pain disorder; phobic, obsessive compulsive dysthymic, adjustment, depersonalization, and posttraumatic disorders; and hypochondriasis.

TABLE 2.27. DIAGNOSIS CATEGORIES FOR DISABILITY DISCHARGES IN 1996–2001: ARMY

Diagnosis category	All discharges	%
Musculoskeletal system, muscle injuries	20,422	67.4
Diseases of trachea and bronchi	1,510	5.0
Psychotic*, mental organic†, and psychoneurotic§ disorders	761	2.5
Organic diseases of central nervous system	637	2.1
Endocrine system	336	1.1
Systemic condition	256	0.8
Diseases of eye, impairment of muscle function	152	0.5
Hemic and lymphatic systems	152	0.5
Heart	144	0.5
Diseases of genitourinary system	133	0.4
Total	30,317	

* Schizophrenia, bipolar disorder, major depression, paranoid disorders, and psychoses.

† Various dementias.

§ Generalized anxiety disorders; psychogenic amnesia; psychogenic fugue; multiple personality disorder; conversion disorder; psychogenic pain disorder; phobic, obsessive compulsive dysthymic, adjustment, depersonalization, and posttraumatic disorders; and hypochondriasis.

Accession Medical Waivers for Active Duty Enlisted Applicants

Applicants who receive a permanent medical disqualification at the MEPS may be granted an accession waiver for the disqualifying condition(s) from a service-specific waiver authority. Tables 2.28–2.32 summarize the accession medical waiver considerations for active duty enlisted applicants in 1996–2001 for the Army, Navy, Marines, and Air Force. All waiver considerations are included, regardless of whether AMSARA has a corresponding MEPS record or whether the individual was subsequently gained onto active duty.

Table 2.28 shows raw counts (i.e., no matching of records to applicant or accession data) of waiver considerations and approval percentages in each year from 1996 to 2001 by service and year of waiver decision. The approval percentages are derived by dividing number of approvals by total number of considerations for a particular waiver authority in a calendar year. Note that a waiver can be denied by one service authority and granted by another, so an individual could be counted more than once.

Approval rates are generally over 50% for the Army, Navy, and Marines, whereas Air Force approvals are generally below 40%. Waiver approval percentages, however, fluctuate within each service over the time examined. For example, the approval rate for the Navy was >77% in 1997 but <45% in 2001. The rates for the Marines showed a similarly large fluctuation, with approval rates generally lowering in the later years. In contrast, Air Force waiver approval percentages rose steadily, with a low of <28% in 1996 to a high of >58% in 2001.

There are many plausible explanations for these fluctuations in approval percentages. For example, reporting of waiver disapprovals may have been incomplete during the early years, a factor that would result in inflated estimates of approval percentages. This possibility is supported by the observation of smaller numbers of total considerations in the earlier years, particularly for the Navy and Marines. Other possible reasons may include changes in application of medical standards and differences in the types of conditions for which waivers were sought.

TABLE 2.28. WAIVER CONSIDERATIONS FOR ACTIVE DUTY APPLICANTS BY SERVICE*

Year	Army		Navy		Marines		Air Force	
	Count	% Approved	Count	% Approved	Count	% Approved	Count	% Approved
1996	7,859	66.4	3,412	61.9	1,731	71.4	1,779	27.8
1997	9,539	53.0	3,150	77.7	1,721	80.9	2,120	38.2
1998	8,579	57.6	5,227	65.5	3,171	65.3	1,733	38.3
1999	9,984	58.1	6,574	52.8	3,825	63.4	1,840	34.7
2000	11,889	66.5	6,242	50.6	3,442	55.7	2,057	41.3
2001	11,911	58.9	5,330	44.2	3,223	42.8	1,975	58.4
Total	59,761	60.1	29,935	56.7	17,113	60.9	11,504	40.1

*Numbers of waivers are greater than those presented in the 2001 annual report because of the following changes. 1) All waivers are included, even those without a corresponding MEPS record. 2) For records with missing date, a closely related date was used when available (e.g., waiver inprocessing date was used for a missing outprocessing date). 3) For individuals with multiple waiver considerations, the chronologically first record indicating approval was selected; if no approval was on record, the chronologically first denial was selected.

Tables 2.29–2.32 provide the most common disqualifying conditions for which waivers were granted for each service. Results are shown for 1996–2000 (average numbers per year) and 2001 separately. Some waiver considerations involve as many as three disqualifying conditions. Counts are of disqualifying conditions for which a waiver was granted, rather than of individuals. Accordingly, individuals with multiple disqualifying conditions may be counted multiple times.

The medical categories are defined by the first three digits of the DoD diagnosis code. Note that descriptions of the medical conditions differ slightly by service, because the waiver authorities do not use the same medical coding system (see Section 1).

Table 2.29 shows the most common conditions for which a medical accession waiver was granted in the Army. Hearing loss is the condition for which the most waivers were granted during 1996–2000 and in 2001 and accounted for about 15% of all conditions for which waivers were approved. Asthma and vision disorders each accounted for about 10% of approved waivers.

TABLE 2.29. TOP 10 DoD DIAGNOSES FOR WAIVERS GRANTED IN 1996–2001: ARMY

DoD code	Definition	1996–2000		2001	
		Count per year	%	Count	%
389	Hearing loss	1,088	14.5	1,028	15.6
493	Asthma	737	9.8	688	10.4
367	Disorders of refraction and accommodation	731	9.8	718	10.9
754	Certain congenital musculoskeletal deformities	357	4.8	176	2.7
401	Hypertension	306	4.1	93	1.4
717	Internal derangement of knee	300	4.0	290	4.4
785	Symptoms involving cardiovascular system	139	1.8	124	1.9
306	Physiological malfunction arising from mental factors	112	1.5	291	4.4
737	Curvature of spine	107	1.4	35	0.5
300	Neurotic, mood, somatoform, dissociative or fascitious disorders	102	1.4	43	0.7

Table 2.30 shows the most common conditions for which a medical accession waiver was granted in the Navy. Asthma is the condition for which the most waivers were granted during 1996–2000 and in 2001, accounting for about 11% of all conditions for which waivers were approved. Hearing loss and vision disorders were also among the leading waiver approval conditions.

TABLES 2.30. TOP 10 DoD DIAGNOSES FOR WAIVERS GRANTED IN 1996–2001: NAVY

DoD code	Definition	1996–2000		2001	
		Count per year	%	Count	%
493	Asthma	482	10.6	621	11.8
389	Hearing loss	459	10.1	606	11.5
367	Disorders of refraction and accommodation	346	7.6	559	10.7
754	Certain congenital musculoskeletal deformities	232	5.1	193	3.7
796	Miscellaneous conditions	231	5.1	91	1.7
717	Internal derangement of knee	194	4.3	77	1.5
401	Hypertension	180	4.0	221	4.2
733	Physiological malfunction arising from mental factors	143	3.2	294	5.6
300	Neurotic, mood, somatoform, dissociative or fascitious disorders	143	3.1	82	1.6
995	Nonspecific abnormal histological or immunological findings	94	2.1	149	2.8

Table 2.31 shows the most common conditions for which an accession waiver was granted in the Marines. Asthma is the condition for which the most waivers were granted, accounting for 12.0% of approvals during 1996–2000 and 14.4% in 2001. Hearing loss and vision disorders were also among the leading waiver approval conditions.

TABLE 2.31. TOP 10 DoD DIAGNOSES FOR WAIVERS GRANTED IN 1996–2001: MARINES

DoD code	Definition	1996–2000		2001	
		Count per year	%	Count	%
493	Asthma	314	12.0	462	14.4
389	Hearing loss	287	10.9	341	10.6
367	Disorders of refraction and accommodation	195	7.4	337	10.5
717	Internal derangement of knee	131	5.0	140	4.4
401	Hypertension	126	4.8	130	4.0
754	Certain congenital musculoskeletal deformities	120	4.6	79	2.5
796	Miscellaneous conditions	118	4.5	237	7.4
733	Orthopedic hardware	100	3.8	135	4.2
300	Neurotic, mood, somatoform, dissociative or fascitious disorders	70	2.7	104	3.2

Table 2.32 shows the most common conditions for which an accession waiver was granted in the Air Force. Vision conditions were involved in 12.3% of approvals during 1996–2000 and 14.7% in 2001. Asthma was the next most common, although an Air Force waiver for asthma is likely different from most in that it indicates that the subject is deemed to never have actually had asthma (i.e., no reliable diagnosis). The Air Force policy has been to deny a waiver to anyone who is believed to have had asthma at any time. Several musculoskeletal conditions also appear among the leading waiver approval conditions.

TABLE 2.32. TOP 10 DOD DIAGNOSES FOR WAIVERS GRANTED IN 1996–2001: AIR FORCE

DoD code	Definition	1996–2000		2001	
		Count per year	%	Count	%
367	Disorders of refraction and accommodation	232	12.3	278	14.7
493	Asthma	169	8.9	179	9.5
389	Hearing loss	147	7.8	88	4.7
734	Pes planus (acquired)	90	4.7	25	1.3
P81	Repair of cruciate ligament	82	4.3	58	3.1
296	Major depressive disorder	58	3.1	42	2.2
718	Instability of joint	58	3.0	41	2.2
P79	Reduction of fracture and dislocation	54	2.9	49	2.6
314	Attention deficit with hyperactivity disorder	52	2.8	149	7.9
754	Certain congenital musculoskeletal deformities	43	2.3	39	2.1

3. DESCRIPTIVE STATISTICS FOR ENLISTED PERSONNEL WITH ACCESSION RECORDS

Summary statistics on data for active duty enlisted personnel gained from 1996 to 2001 are presented. Except where otherwise noted, the following conventions apply:

- All statistics are for active duty personnel. Reserves and National Guard are not included.
- All references to dates refer to calendar year.
- All merging of data sets to derive percentages and rates was performed at an individual level by SSN. For example, in determining the percentage of individuals gained in 2001 who received a discharge, only discharges with SSN matching a 2001 accession record SSN were included.
- Reference to "all applicants" refers to those who had a physical examination at MEPS. Applicants who were dropped from consideration before the medical exam (e.g., those who failed the AFQT) are not included.
- Totals may vary slightly among tables depending on the variable by which percentages or rates are presented. Records with a missing variable relevant to a given table are not included in that table.
- Education level and age at the time of MEPS application are used under "MEPS/Gain" and "Waivers with Matching MEPS Record" because MEPS data are the only source of this information for activities before accessions. For "Hospitalizations," "EPTS Discharges," and "Disability Discharges for Army and Air Force," education level and age at time of accession are used.

MEPS/Gain

Approximately 1,400,000 applicants were examined for medical fitness at MEPS in 1996–2001. Data on these applicants were merged with gain data provided by DMDC to examine accession patterns.

Table 3.1 shows the numbers of applicants and subsequent accession percentages for the aggregate 1996–2000 period and separately for 2001. Accession percentages for the 1996–2000 applicants are shown in two ways: 1) total accession and 2) accession within calendar year of application. For example, the first row shows that 63.2% of Army applicants during 1996–2000 had a subsequent accession record, whereas only 38.2% of the applicants were accessed within the same calendar year in which they applied. The second percentage is presented to make a fair basis of comparison for the 2001 accessions; at the time this report was prepared, accession data were not available beyond the end of 2001.

The numbers of applications to the Army and Marines in 2001 are fairly consistent with those of the previous 5 years, because the 2001 applications are roughly one-fifth the number shown over the previous 5 years combined. The applications to the Air Force and Navy in 2001 are somewhat higher than expected, based on the 1996–2000 applications.

Accession rates within 2001 are similar to the rates seen over 1996–2000 for the Army, Navy, and Marines. The Air Force, however, showed a much lower within-year accession rate in 2001 (38.4 per 100) than over 1996–2000 (48.5 per 100). It is unclear whether this

represents an actual change in accession rates, but it is noted for future examination when follow-up data are available.

TABLE 3.1. ACCESSIONS FOR ENLISTED APPLICANTS AT MEPS WHO RECEIVED A MEDICAL EXAMINATION BY SERVICE: COMPARING 1996–2000 AND 2001

Service	1996–2000			2001	
	Count	Accession rate/100	Accession rate/100 within year	Count	Accession rate/100 within year
Army	44,4750	63.2	38.2	93,440	40.9
Navy	298,508	69.1	42.8	66,718	46.6
Air Force	187,637	79.0	48.5	46,242	38.4
Marines	218,906	68.0	35.2	43,043	35.8
Total	1,149,801			249,443	

Table 3.2 shows accessions according to length of time since application. Most of these accessions have occurred within 1 year and within 2 years of application for service. Calculated accession rates are noticeably low in 1997 because Army data are lacking for the second half of 1997. Army data are also low in 2001 owing to the lack of data for a full year of follow-up. These caveats aside, it appears that approximately two-thirds of applicants are gained onto active duty within 1 year of applying, with only a small percentage being gained more than 1 year after application.

TABLE 3.2. ACCESSIONS FOR ENLISTED APPLICANTS WITHIN 1 AND 2 YEARS OF APPLICATION WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2001

Year of exam	Applicants	No. within 1 year of application	% within 1 year of application	No. within 2 years of application	% within 2 years of application
1996	247,973	157,524	63.5	166,787	67.3
1997	225,905	125,549	55.6	135,603	60.0
1998	205,808	130,496	63.4	140,818	68.4
1999	229,885	153,879	66.9	163,396	71.1
2000	240,230	162,049	67.5	166,979	69.5
2001*	249,443	102,443	41.1*	NA	NA

* Incomplete follow-up time.

Demographic features of enlisted applicants in 1996–2000 and 2001, and of each of these applicant pools that were subsequently gained, are shown in Tables 3.3–3.7. Totals vary somewhat among tables because data are missing.

Most applicants in 2001 were male (about 80%), aged 17–20 (about 75%), and white (73%). The demographic profiles were roughly the same for applicants in 1996–2000. Over 30% of applicants in both periods had not completed high school at the time of application.

Demographic distributions of accessions reflect the applicant population with regard to gender, age, race, and AFQT score. Slight differences may be seen between applicants and accessions in 2001, although these differences are likely attributable to lack of follow-up data and to random fluctuations that occur within any given year.

The percentage of accessions that had at least a high school education at the time of application was higher than that among applicants. This difference likely reflects the fact that many applicants with less than a high school education at the time of application were still in school by the end of the year and thus had not begun service.

The distribution of AFQT scores was similar between applicants and accessions in both 1996–2000 and 2001. This similarity likely reflects the fact that individuals achieving a low score on the AFQT are often eliminated from consideration before being given a medical exam. Accordingly, such individuals do not appear among the applicant data.

TABLE 3.3. GENDER OF ENLISTED APPLICANTS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000: COMPARING 1996–2000 AND 2001

Gender	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Female	231,203	20.1	141,734	18.1	49,670	19.9	18,701	18.3
Male	918,575	79.9	642,623	81.9	199,769	80.1	83,741	81.7

TABLE 3.4. RACE OF ENLISTED APPLICANTS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2001: COMPARING 1996–2000 AND 2001

Race	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
White	801,999	69.8	547,562	69.8	182,138	73.0	72,589	70.9
Black	226,455	19.7	151,488	19.3	44,445	17.8	19,874	19.4
Other	120,508	10.5	84,469	10.8	22,859	9.2	9,979	9.7

TABLE 3.5. AGE OF ENLISTED APPLICANTS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2001: COMPARING 1996–2000 AND 2001

Age	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
17–20 yr	881,976	76.7	609,272	77.7	186,586	74.8	74,400	72.6
21–25 yr	210,239	18.3	141,517	18.0	48,517	19.5	22,447	21.9
26–30 yr	45,442	4.0	27,067	3.5	11,073	4.4	4,418	4.3
>30 yr	12,144	1.1	6,502	0.8	3,267	1.3	1,178	1.2

TABLE 3.6. EDUCATION LEVEL OF ENLISTED APPLICANTS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000: COMPARING 1996–2000 AND 2001

Education level	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Below HS senior*	33,855	2.9	20,051	2.6	8,833	3.5	2,889	2.8
HS senior	341,129	29.7	204,552	26.1	72,263	29.0	14,912	14.6
HS diploma	739,263	64.3	536,912	68.5	159,770	64.1	81,190	79.3
Some college	9,608	0.8	6,951	0.9	2,296	0.9	1,065	1.0
Bachelor's and above	24,616	2.1	14,829	1.9	5,406	2.2	1,883	1.8

*Encompasses the following three cases: 1) one who is pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc; 2) one who is not attending high school and who is neither a high school graduate nor an alternative high school credential holder; 3) one who is attending high school and is not yet a senior.

TABLE 3.7. AFQT SCORES OF ENLISTED APPLICANTS WHO RECEIVED A MEDICAL EXAMINATION IN 1996–2000: COMPARING 1996–2000 AND 2001

AFQT score	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
93–99	46,619	4.1	33,108	4.2	10,444	4.2	4,262	4.2
65–92	383,739	33.4	272,618	34.8	83,981	33.7	34,991	34.2
50–64	315,367	27.4	220,041	28.1	69,207	27.7	28,900	28.2
30–49	363,482	31.6	246,031	31.4	77,608	31.1	33,498	32.7
1–29	36,637	3.2	12,414	1.6	6,854	2.8	600	0.6

Table 3.8 shows the medical qualification status among applicants and subsequent accessions for enlisted active duty during 1996–2000 and 2001. An applicant with a permanent medical disqualification may apply for a medical waiver that would allow accession onto active duty. Individuals with a temporary medical disqualification (e.g., for being overweight) may have the disqualification removed and access once the condition is remedied.

It can be seen that the percentages of accessions with a prior medical disqualification, either permanent or temporary, is smaller than the percentage among applicants. For permanent disqualifications, this difference reflects the fact that the disqualified applicants often do not pursue a medical waiver, and some who do are denied the waiver. For temporary waivers, this difference may reflect an unwillingness or inability to remedy the problem or may reflect that the applicant did not try again.

TABLE 3.8. MEDICAL QUALIFICATION STATUS OF ENLISTED APPLICANTS AND SUBSEQUENT ACCESSIONS: COMPARING 1996–2000 AND 2001

Qualification	1996–2000				2001			
	Applicants		Accessions		Applicants		Accessions	
	Count	%	Count	%	Count	%	Count	%
Qualified	909,094	79.1	683,153	87.1	202,071	81.0	91,178	89.0
Permanent DQ	103,085	9.0	34,956	4.5	19,896	8.0	3,534	3.5
Temporary DQ	137,622	12.0	66,249	8.5	27,476	11.0	7,731	7.6

Waivers with Matching MEPS Record

Applicants medically disqualified at the MEPS may receive an accession waiver for the disqualifying condition(s) from a service-specific waiver authority (see Section 1). Because Section 4 examines only those waiver records for which there is a matching applicant record in the MEPS data, the counts of waiver records will differ from those in Section 3, in which counts include all waiver records, irrespective of whether a corresponding MEPS record exists.

Individuals frequently have multiple records of waiver consideration by the same waiver authority, which likely reflects resubmissions, perhaps with additional information. Only the most current record on each individual was considered. Therefore the numbers of considerations do not reflect overall workload of the waiver authorities.

Note that a waiver application that is denied by one waiver authority might be submitted to another. In such a case, the individual would be counted twice in the tables. Finally, note that only waiver applications are summarized, and these individuals may eventually gain or have been gained into duty.

Table 3.9 shows the numbers of individuals granted accession medical waiver approvals during each year from 1996 through 2001. Also shown are the numbers and percentages of these individuals who were subsequently gained onto active duty within 1 and 2 years of application.

The numbers of waiver approvals have increased over the period examined, with >8,171 in 1996 to a peak of >11,500 in 2000. This increase can be partly attributed to an increased number of waiver considerations by each waiver authority over time.

Accession percentages of these applicants were generally over 50% within 1 year of initial application. The only exceptions were among those granted a waiver in 1997, when Army accession data were grossly short, and 2001, for which there were incomplete follow-up data. Also, except for 1997 and 2001, the 2-year accession percentages ranged from 65% to 69%.

**TABLE 3.9. ACCESSIONS WITHIN 1 AND 2 YEARS OF PHYSICAL EXAMINATION
FOR ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1996–2001 BY YEAR**

Year of waiver consideration	Applicants with waivers granted	Applicants who accessed within 1 year of application		Applicants who accessed within 2 years of application	
		Count	Rate/100	Count	Rate/100
1996	8,171	4,521	55.3	5,422	66.4
1997	8,757	4,192	47.9	5,026	57.4
1998	9,105	4,910	53.9	5,952	65.4
1999	10,882	6,484	59.6	7,507	69.0
2000	11,535	6,609	57.3	7,499	65.0
2001	10,392	4,205	40.5*	4,621	NA
Total	58,842	30,921		36,027	

*Incomplete follow-up time.

Tables 3.10–3.14 describe the demographic features of applicants during 1996–2000 and 2001 who were medically disqualified and subsequently granted an accession medical waiver. Results are shown for individuals with a waiver approval and for the subset of individuals who subsequently were gained onto active duty.

Table 3.10 shows the gender distribution of applicants receiving a waiver and those who subsequently came onto active duty. The distribution was the same in 1996–2000 and 2001. Females accounted for a slightly smaller percentage of subsequent accessions than of waiver approvals.

**TABLE 3.10. GENDER OF ENLISTED APPLICANTS WHO RECEIVED A WAIVER:
COMPARING RATES FOR 1996–2000 AND 2001**

Gender	1996–2000				2001			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
Female	9,414	19.4	5,781	17.2	2,012	19.4	836	16.7
Male	39,036	80.6	27,787	82.8	8,379	80.6	4,168	83.3

Table 3.11 shows that the age distribution of applicants with waiver approvals was similar in 1996–2000 and 2001. The age distribution of those who were subsequently accessed closely reflected the applicant distribution.

TABLE 3.11. AGE OF ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1996–2000 AND 2001

Age	1996–2000				2001			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
17–20 yr	35,814	73.9	25,201	75.1	7,457	71.8	3,678	73.5
21–25 yr	9,348	19.3	6,459	19.2	2,066	19.9	999	20.0
26–30 yr	2,436	5.0	1,493	4.4	628	6.0	248	5.0
>30 yr	852	1.8	415	1.2	241	2.3	80	1.6

Table 3.12 shows that whites made up a slightly greater percentage of waiver approvals among 2001 applicants than among 1996–2000 applicants. This increase may reflect a difference in the applicant pool, differing likelihood of disqualifying conditions by race, or random variation. The distribution of subsequent accessions was similar to the applicant distribution.

TABLE 3.12. RACE OF ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1996–2000 AND 2001

Race	1996–2000				2001			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
White	34,697	71.6	24,006	71.5	7,905	76.1	3,710	74.1
Black	9,105	18.8	6,313	18.8	1,642	15.8	873	17.4
Other	4,595	9.5	3,196	9.5	844	8.1	421	8.4

Table 3.13 shows the distribution of applicants with a waiver approval and of those subsequently accessed by education level at the time of application. The distribution among applicants was similar in 2001 and 1996–2000. More accessions had at least a high school education when compared with all applicants with a waiver approval.

TABLE 3.13. EDUCATION LEVEL OF ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1996–2000 AND 2001

Education level	1996–2000				2001			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
Below HS senior*	2,043	4.2	1,082	3.2	494	4.8	194	3.9
HS senior	13,642	28.2	8,934	26.6	2,974	28.6	1,185	23.7
HS diploma	30,672	63.3	22,296	66.4	6,372	61.3	3,422	68.4
Some college	479	1.0	313	0.9	133	1.3	53	1.1
BS and higher	1,588	3.3	924	2.8	386	3.7	131	2.6

*Encompasses the following three cases: 1) one who is pursuing completion of the GED or other test-based high school equivalency diploma, vocational school, or secondary school, etc; 2) one who is not attending high school and who is neither a high school graduate nor an alternative high school credential holder; 3) one who is attending high school and is not yet a senior.

Table 3.14 summarizes percentile scores on the AFQT among applicants and subsequent accessions with an accession medical waiver. The score distribution among applicants is similar in 1996–2000 and 2001. The percentage of individuals in the highest percentile group was slightly lower among those applicants with a waiver who subsequently accessed.

TABLE 3.14. AFQT OF ENLISTED APPLICANTS WHO RECEIVED A WAIVER IN 1996–2000 AND 2001

AFQT score	1996–2000				2001			
	All waivers		Accessed only		All waivers		Accessed only	
	Count	%	Count	%	Count	%	Count	%
93–99	3,300	6.8	2,162	6.4	731	7.0	276	5.5
65–92	17,866	36.9	12,255	36.5	3,859	37.1	1,712	34.2
50–64	12,959	26.7	9,090	27.1	2,853	27.5	1,450	29.0
30–49	1,366	28.2	9,716	28.9	2,772	26.7	1,496	29.9
0–29	578	1.2	342	1.0	147	1.4	67	1.3

Hospitalizations

The numbers of hospitalizations and the numbers of individuals hospitalized among recruits who began active duty during 1996–2001 are presented. Relative risks are used to compare the likelihood of hospitalization across demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group. One exception is AFQT, in which descending score groups are examined.

Table 3.15 shows hospitalizations and persons hospitalized among recruits accessed during each year from 1996 through 2001. The results are first presented for hospitalizations that occurred within the same year in which the recruit began active duty. This presentation forms a fair basis of comparison for those gained in 2001, because hospitalization data were only available through 2001 for this group. The results are also shown for each accession year group with a full year of follow-up on each individual.

Recruits gained in 2000 had higher rates of hospitalization and numbers of persons hospitalized than in any year other than 1996. This is surprising given that hospitalization rates had been declining steadily before 2000. Further scrutiny of this result is warranted.

TABLE 3.15. HOSPITALIZATIONS BY ACCESSION YEAR: 1996–2001

Year	Total accessed	Within same gain year			Within 1 year of service		
		Count	Persons	% of persons	Count	Persons	% of persons
1996	162,486	7,355	6,534	4.02	12,130	10,474	6.45
1997	140,116	4,097	3,661	2.61	6,733	5,851	4.18
1998	132,780	2,963	2,672	2.01	5,493	4,834	3.64
1999	170,005	3,837	3,504	2.06	7,358	6,504	3.83
2000	175,378	5,979	5,419	3.09	9,364	8,269	4.71
2001	161,708	3,894	3,526	2.18	NA	NA	NA

Tables 3.16–3.20 summarize numbers of hospitalizations and numbers of individuals hospitalized within 1 year of accession by demographic groups among enlisted personnel beginning duty during 1996–2001. Note that these numbers and percentages are slight underestimates, because follow-up data for recruits who were accessed in 2001 were incomplete.

Compared with other services, Army enlistees were most likely to be hospitalized. Females and older recruits had a higher likelihood of hospitalization. Whites were less likely to be hospitalized than blacks but had higher hospitalization likelihood than other races. There was only a slight difference in hospitalization likelihood by education level, with those having a high school diploma being at lower risk for hospitalization compared with those without a diploma. Finally, recruits in the 93–99 percentile group on the AFQT had a lower likelihood of hospitalization than those scoring in the lower percentile groups.

**TABLE 3.16. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED 1996–2001: SERVICE**

Service	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
Army	334,341	19,969	17,142	5.13	1.00	
Navy	250,790	9,406	8,441	3.37	0.66	0.64, 0.67
Marines	178,819	6,748	5,994	3.35	0.65	0.64, 0.67
Air Force	178,523	8,864	7,894	4.42	0.86	0.84, 0.89

**TABLE 3.17. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED IN 1996–2001: GENDER**

Gender	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
Male	770,731	32,765	28,957	3.76	1.00	
Female	171,741	12,222	10,514	6.12	1.63	1.59, 1.67

**TABLE 3.18. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED IN 1996–2001: AGE**

Age	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
17–20 yr	736,679	33,355	29,463	4.00	1.00	
21–25 yr	167,525	9,089	7,879	4.70	1.18	1.15, 1.20
26–30 yr	30,550	1,998	1,677	5.49	1.37	1.31, 1.44
>30 yr	7,719	545	452	5.86	1.46	1.34, 1.60

**TABLE 3.19. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED IN 1996–2001: RACE**

Race	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
White	662,846	31,862	27,958	4.22	1.00	
Black	179,914	9,008	7,855	4.37	1.04	1.01, 1.06
Other	95,417	3,908	3,472	3.64	0.86	0.83, 0.89

**TABLE 3.20. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED IN 1996–2001: EDUCATION LEVEL**

Education level	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
Below HS	41,398	2,090	1,822	4.40	1.00	
HS diploma	856,130	40,764	35,764	4.18	0.95	0.91, 0.99
Some college	29,502	1,430	1,267	4.29	0.98	0.91, 1.05
Bachelor's	14,822	680	598	4.03	0.92	0.84, 1.00

**TABLE 3.21. HOSPITAL ADMISSIONS WITHIN 1 YEAR OF ACCESSION FOR ENLISTED PERSONNEL
ACCESSED IN 1996–2001: AFQT SCORE**

AFQT score	Enlisted accessions	Hospital admissions	Persons hospitalized			
			Count	%	Relative risk	95% CI
93–99	41,529	1,705	1,517	3.65	1.00	
65–92	306,173	14,271	12,579	4.11	1.12	1.07, 1.19
50–64	237,936	11,908	10,356	4.35	1.19	1.13, 1.26
30–49	249,605	11,791	10,316	4.13	1.13	1.07, 1.19
0–29	107,022	5,308	4,699	4.39	1.20	1.14, 1.27

Table 3.22 shows the most common medical categories for hospitalizations and the numbers of admissions and individuals admitted for those conditions among recruits accessed during 1996–2001. Medical categories were those specified in ICD9. The category “neurotic and personality disorders” is clearly the most common category of hospitalizations, particularly for hospitalizations occurring during the first year of service. Not surprisingly, “injuries” is the next most common, reflecting the physically demanding nature of basic training and early enlisted service.

TABLE 3.22. HOSPITALIZATIONS AND PERSONS HOSPITALIZED WITHIN 1 AND 2 YEARS OF SERVICE BY CATEGORY FOR ENLISTED PERSONNEL ACCESSED IN 1996–2001

Category	Within 1 year of accession		Within 2 years of accession	
	Hospital admissions	Persons hospitalized	Hospital admissions	Persons hospitalized
Neurotic and personality disorders	11,497	9,887	15,502	12,866
Injuries	3,764	3,497	7,015	6,334
Other psychoses	2,348	1,877	3,483	2,494
Other diseases due to virus	2,157	2,042	2,345	2,197
Pneumonia and influenza	2,057	1,945	2,231	2,084
Symptoms	1,796	1,510	2,726	2,178
Acute respiratory infections	1,692	1,587	1,902	1,765
Infections of skin	1,667	1,546	2,204	2,004
Complications of pregnancy	1,351	1,126	12,160	10,014
Alcohol and drug dependency	1,305	1,048	2,455	1,935
Diseases of oral cavity	982	948	1,490	1,400
Appendicitis	873	831	1,550	1,441
Other diseases of respiratory system	787	709	1,302	1,139
Poisonings, toxic effects	732	646	1,112	945
Hernia of abdominal cavity	716	686	971	912
Noninfectious enteritis	647	563	942	784
Arthropathies and related disorders	589	516	1,758	1,500
Chronic obstructive pulmonary disease and allied conditions	572	510	673	591
Other diseases of urinary system	557	489	932	778
Viral diseases accompanied by exanthem	509	492	600	572
Other bacterial diseases	448	415	498	458
Others	7,941	6,601	12,948	10,223
Total	44,987	39,471	76,799	64,614

EPTS Discharges

The numbers of discharges for EPTS conditions among recruits accessed during 1996–2001 are presented. Relative risks are used to compare likelihood of EPTS discharge between demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group. One exception is AFQT, in which descending score groups are examined. Remember when examining these tables that reporting rates may vary by service and over time.

Table 3.23 shows EPTS discharges reported among individuals accessed into enlisted service during each year from 1996 through 2001. The numbers of EPTS discharges reported during 2000 and 2001 apparently drop compared with previous years.

TABLE 3.23. EPTS DISCHARGES BY ACCESSION YEAR

Year	Total accessed	Count	%
1996	162,486	6,329	3.90
1997	140,116	6,488	4.63
1998	132,780	7,164	5.40
1999	170,005	6,278	3.69
2000	175,378	4,911	2.80
2001	161,708	4,283	2.65

Tables 3.24–3.29 summarize discharges for EPTS conditions among individuals beginning active duty during 1996–2001 by demographic factors. Table 3.24 indicates that the likelihood of an EPTS discharge is significantly higher among enlistees in the Navy than in the Army. Conversely, enlistees in the Marines and Air Force have significantly lower likelihood of EPTS discharge than enlistees in the Army. However, EPTS reporting is not uniform across all services or even across different basic training sites within the same service (see Section 1). Moreover, the services differ regarding which discharges are classified as EPTS. Therefore, differences observed between services may more reflect procedural or reporting differences than actual differences of discharge likelihood.

TABLE 3.24. ENLISTED ACCESSIONS IN 1996–2001 ENDING IN EPTS DISCHARGE: SERVICE

Service	Total accessed	Discharged	% Discharged	Relative risk	95% CI
Army	334,341	15,200	4.55	1.00	
Navy	250,790	13,082	5.22	1.15	1.12, 1.17
Marines	178,819	6,257	3.50	0.77	0.75, 0.79
Air Force	178,523	3,788	2.12*	0.47*	0.45, 0.48

*Air Force did not provide records for discharges in April 2000–September 2001, so the discharge rate and relative risk for Air Force are underestimates.

Tables 3.25–3.29 show EPTS discharge percentages according to different demographic factors. Females had a significantly higher likelihood of EPTS discharge; older enlistees had a significantly higher likelihood than those aged 17–20 years at the time of accession; and nonwhites had significantly lower likelihood than whites. Those who began active duty without a high school diploma had a higher risk than those who had at least a high school diploma. There was a statistically significant trend of higher likelihood of EPTS discharge for the lower AFQT score group.

TABLE 3.25. ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1996–2001: GENDER

Gender	Total accessed	Discharged	% Discharged	Relative risk	95% CI
Male	770,731	29,105	3.78	1.00	
Female	171,741	9,222	5.37	1.42	1.39, 1.45

TABLE 3.26. ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1996–2001: AGE

Age	Total accessed	Discharged	% Discharged	Relative risk	95% CI
17–20 yr	736,679	28,564	3.88	1.00	
21–25 yr	167,525	7,756	4.63	1.19	1.17, 1.22
26–30 yr	30,550	1,601	5.24	1.35	1.29, 1.42
>30 yr	7,719	406	5.26	1.36	1.23, 1.49

TABLE 3.27. ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1996–2001: RACE

Race	Total accessed	Discharged	% Discharged	Relative risk	95% CI
White	662,846	29,172	4.40	1.00	
Black	179,914	6,157	3.42	0.78	0.76, 0.80
Other	95,417	2,902	3.04	0.69	0.67, 0.72

TABLE 3.28. ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1996–2001: EDUCATION LEVEL

Education level	Total accessed	Discharged	% Discharged	Relative risk	95% CI
Below HS	41,398	2,038	4.92	1.00	
HS senior	856,130	35,048	4.07	0.83	0.79, 0.86
HS diploma	29,502	818	2.77	0.56	0.52, 0.61
Some college	14,822	405	2.73	0.56	0.50, 0.62

TABLE 3.29. ENLISTED ACCESSIONS ENDING IN EPTS DISCHARGE IN 1996–2001: AFQT SCORE

AFQT score	Total accessed	Discharged	% Discharged	Relative risk	95% CI
93–99	41,529	1,246	3.00	1.00	
65–92	306,173	11,515	3.76	1.25	1.18, 1.33
50–64	237,936	10,633	4.47	1.49	1.41, 1.58
30–49	249,605	11,302	4.53	1.51	1.42, 1.60
0–29	107,022	3,627	3.39	1.13	1.06, 1.20

Disability Discharges for Army and Air Force

The numbers of discharges for medical disability among recruits accessed during 1996–2001 are presented. Relative risks are used to compare likelihood of EPTS discharge between demographic groups. A baseline group is chosen for each comparison, and in most cases this is the largest group. One exception is AFQT, in which descending score groups are examined. Disability discharge data were unavailable for the Navy or Marines.

Table 3.30 shows the numbers of disability discharges reported among individuals accessed into enlisted service during each year from 1996 through 2001. The results are first presented for discharges that occurred within the same year in which the recruit began active duty. This

presentation forms a fair basis of comparison for those gained in 2001, because disability discharge data were only available through 2001 for this group. The results are also shown for each accession year group with a full year of follow-up on each individual.

There is no clear pattern to the disability discharge percentages over the time shown. The percentages discharged during the same year of accession range from 0.17% to 0.27% (i.e., fewer than two or three per thousand). When considering a full year of follow-up after accession for all individuals, the disability discharge rates are roughly 0.5% for all accession years. After comparing these discharge percentages with Table 3.23, it is clear that a new recruit is much more likely to be discharged for an EPTS condition than for a condition that surfaced during early service.

TABLE 3.30. DISABILITY DISCHARGES WITHIN SAME ACCESSION YEAR AND WITHIN 1 YEAR: 1996–2001

Year	Total accessed	Discharged in same accession year		Discharged within 1 year of service	
		Count	%	Count	%
1996	94,428	212	0.22	462	0.49
1997	69,993	180	0.26	316	0.45
1998	76,916	129	0.17	355	0.46
1999	92,028	184	0.20	513	0.56
2000	95,556	215	0.23	514	0.54
2001	83,943	225	0.27	NA	NA

Tables 3.31–3.36 show the percentages of accessions ending in disability discharge by different demographic factors. Army enlistees have a higher likelihood of disability discharge than Air Force enlistees, although this result may be influenced by different categorizations by the services.

Females had more than double the risk of males for disability discharge. Likelihood of disability discharge increased by increasing age group, with those who were older than 30 years at accession having about 2.8 times the risk of those entering at age 17–20 years. Whites were more likely than blacks or others to have a disability discharge. There was no significant difference in likelihood of disability discharge according to education level or AFQT score.

TABLE 3.31. ACTIVE DUTY ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001

Service	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
Army	334,341	1,722	0.52	1.00	
Air Force	178,523	664	0.37	0.72	0.66, 0.79

TABLE 3.32. ACTIVE DUTY ARMY AND AIR FORCE ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001: GENDER

Gender	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
Male	397,410	1,493	0.38	1.00	
Female	115,453	893	0.77	2.06	1.90, 2.24

TABLE 3.33. ACTIVE DUTY ARMY AND AIR FORCE ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001: AGE

Age	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
17–20 yr	397,981	1,654	0.42	1.00	
21–25 yr	91,075	536	0.59	1.42	1.28, 1.56
26–30 yr	18,873	139	0.74	1.77	1.49, 2.11
>30 yr	4,935	57	1.16	2.78	2.14, 3.61

TABLE 3.34. ACTIVE DUTY ARMY AND AIR FORCE ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001: RACE

Race	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
White	359,309	1,787	0.50	1.00	
Black	106,862	424	0.40	0.80	0.72, 0.89
Other	44,731	167	0.37	0.75	0.64, 0.88

TABLE 3.35. ACTIVE DUTY ARMY AND AIR FORCE ENLISTED ACCESSIONS ENDING IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001: EDUCATION LEVEL

Education level	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
Below HS senior	26,186	104	0.40	1.00	
HS senior	451,475	2,115	0.47	1.18	0.97, 1.44
HS diploma	23,580	110	0.47	1.18	0.90, 1.54
Some college	11,358	56	0.49	1.24	0.90, 1.72

**TABLE 3.36. ACTIVE DUTY ARMY AND AIR FORCE ENLISTED ACCESSIONS ENDING
IN DISABILITY DISCHARGE WITHIN 1 YEAR OF SERVICE IN 1996–2001: AFQT SCORE**

AFQT score	Total accessed	Discharged within 1 year of accession	% Discharged	Relative risk	95% CI
93–99	23,348	92	0.39	1.00	
65–92	171,608	824	0.48	1.22	0.98, 1.51
50–64	137,029	635	0.46	1.18	0.95, 1.46
31–49	127,930	599	0.47	1.19	0.95, 1.48
1–30	52,800	236	0.45	1.13	0.89, 1.44

4. FUTURE DELIVERABLES

Exhaled Nitric Oxide Levels May Assist in Identifying Asthma at MEPS

Asthma reliably diagnosed at any age disqualifies an applicant for military service. Unfortunately, many applicants do not reveal disease during the entrance medical examination, resulting in approximately 1,000 military recruits being discharged for asthma during basic combat training (BCT).

Elevated levels of exhaled nitric oxide have been clinically correlated with airway inflammation among asthmatics. A study funded by the Army Accession Command will determine whether applicants are more likely to reveal their asthma or history of asthma when given an objective measure they are told is correlated with asthma.

The protocol was approved by the WRAIR Institutional Review Board, with permission from MEPCOM. Volunteers for testing baseline nitric oxide levels are being gathered among applicants at the Baltimore MEPS.

All applicants are routinely questioned about history of asthma during the physical exam. In addition to these questions, the volunteers complete a self-administered questionnaire about asthma-related symptoms and factors that might affect nitric oxide levels. After the nitric oxide test, volunteers who tested high are told that according to the measured nitric oxide they may have asthma. A trained interviewer will then further question their medical history to determine the accuracy of the test. Volunteers will be assured that participation in the study will not adversely affect their ability to enter active service.

The goal is to test 3,000 applicants for exhaled nitric oxide and determine whether this test may be a useful adjunct to the physical exam in processing applicants. As of December 2002, 437 applicants have been enrolled in the study.

Accuracy of Initial Entry Training Discharge Classifications at Fort Leonard Wood: Entry Level Separation versus EPTS Discharge

Synopsis and Military Relevance

Trainee discharge before completion of the first term of service is an expensive problem in the Army. From 1995 through 1999, approximately 10% of first-time active duty enlistees were lost during the first 6 months of service, with most losses occurring during BCT. The cost of recruiting and training one replacement enlistee has been estimated to be as high as \$30,000, resulting in an annual cost to DoD of \$350 million. Any attempts to reduce early attrition and its associated costs must begin with accurate information regarding why recruits are being lost. For example, the preventive measures needed to reduce EPTS discharges would differ from measures needed to reduce motivation or performance problems.

Grounds for administrative discharges are detailed in Army Regulation 635-200, and grounds for medical discharges are detailed in Army Regulation 40-501 (Table 4-1).

TABLE 4.1. GENERAL CATEGORIES OF DISCHARGES FOR BASIC TRAINEES

Army regulations	Chapter	Description
635-200	5-13.1	Personality disorder
635-200	5-17.1	Other designated physical or mental conditions
635-200	7-17.1	Fraudulent enlistment
635-200	9	Drug and alcohol rehabilitation failure
635-200	11	Entry-level performance and conduct
635-200	13	Unsatisfactory performance
635-200	14-12.1	Misconduct
40-501	2 and 3	Failure to meet accession medical standards

The official reason for discharge among basic trainees is decided at each BCT site. AMSARA studies of discharges have relied on the BCT site characterization of these discharges, and the possibility of multiple reasons for discharge has not been independently verified. For example, mental disorders may exist with other medical disorders, and the combination may contribute to a soldier receiving a discharge under any chapter of Army Regulation 635-200 listed in Table 4.1. A medical problem such as depression may manifest as a behavior or performance problem, so the discharge may be classified as behavior or performance. Conversely, a behavioral problem may manifest as a chronic medical complaint and be so classified. There may be other reasons for misclassification, such as using the most expeditious form of discharge or avoiding the use of a discharge type targeted for reduction by the chain of command. Because of these possibilities, AMSARA's attrition studies related to medical conditions have considered all causes of attrition.

The aim of this study, sponsored by the Army Accessions Command, is to assess the degree of agreement in classification between the BCT site and AMSARA for discharges from basic training. The study will cover the 12 months from September 2002 through August 2003. The primary focus is whether certain types of discharges are more likely to have a co-existing psychiatric or other medical condition. A secondary objective is to compare the distribution of losses by category with that in previous years. Any dramatic change over time might reflect systematic change in classification policy or practice. Finally, the medical categories of records classified as EPTS will be compared with records from previous years. The aim is to note any dramatic increases or decreases in particular medical categories, perhaps indicating a change in how such categories are being classified.

Objectives

1. Determine nature, direction, and degree of agreement in classification of discharges at Fort Leonard Wood, including the frequency of psychiatric and other medical conditions, across the discharge categories described in Army Regulation 635-200.
2. Compare distribution of discharge categories with that found in the previous year. Comparison can be performed both for those classified by AMSARA and for those classified by Fort Leonard Wood, if these constitute dramatically different data sets.

3. For EPTS discharges, further specify the medical condition and compare the distribution to EPTS discharges in the same months of previous years. This comparison can be performed both for those classified as EPTS by AMSARA and for those classified by Fort Leonard Wood if these constitute dramatically different data sets.

Product

1. A 6-month analysis has been completed and a presentation generated and submitted to the commander of the Fort Leonard Wood MEDDAC and the surgeons of MEPCOM and TRADOC.
2. The final 12-month analysis and report will be prepared in fall 2003 and will be submitted to the MEDDAC, MEPCOM, and TRADOC. In addition, a manuscript will be submitted to a peer-reviewed journal.

Quadrennial Timetable for Draft of DoD Instruction 6130.4

The Accession Medical Standards Working Group (AMSWG) has adopted a 4-year timetable for the next revision of DoD Directive 6130.3 and DoD Instruction 6130.4, "Physical Standards for Appointment, Enlistment, or Induction." AMSWG anticipates that all 19 specialty reviews of the current standards by medical topic will be completed by December 2003, with final approval for changes to DoD Instruction 6130.4 in December 2004. Specialty reviews planned for 2003 include infectious disease, cardiology, rheumatology, ophthalmology, and internal medicine. Survival analyses of recruits with a waiver for hypertension, scoliosis, pes planus, and headache are currently being conducted by AMSARA as part of this review.

AMSARA will continue to provide input into each accession standard specialty grouping. Information provided will vary by condition and may include counts of disqualifications, waiver applications and approvals, condition-related hospitalizations, and medical and administrative discharges.

Service-Specific EPTS Tracking Systems Monitor Completeness of Reporting by Initial Entry Training Sites to MEPCOM

A major objective of AMSARA is to prevent accession of applicants who will not be medically able to succeed in the military. Toward this objective, AMSARA studies individuals who have been discharged during the first few months of service for EPTS medical conditions. To obtain data on these discharges, AMSARA depends on the nine Initial Entry Training (IET) sites forwarding hard copies of all EPTS records to MEPCOM headquarters. After capturing its desired information, MEPCOM then forwards the records to AMSARA where they are coded by diagnoses and entered into an electronic database and the records filed. These data are used by AMSARA in many applications, including 1) to identify potential high-yield medical conditions for study, 2) as an endpoint in military retention studies, and 3) to perform case series reviews of specific diagnoses.

The requirement for IET sites to forward EPTS records to MEPCOM is not in any service-specific regulation. A memorandum dated 30 November 2001 signed by the Deputy Assistant Secretary of Defense Military Personnel Policy directs this action. AMSARA has noted dramatic variation in numbers of cases reported by IET sites. To estimate reporting rates by

IET site, AMSARA is continually seeking, and has gained access to, service-specific and even site-specific EPTS tracking systems.

The Army Medical Command Patient Administration Division (PAD) developed the Medical Evaluation Boards Internal Tracking Tool (MEBITT) in FY99. Local PAD offices enter data on all Medical Evaluation Boards from start to finish. More recently, MEBITT was expanded to include EPTS discharges. Data collected include demographics, diagnoses, profiles, and processing time. AMSARA has developed a standing request for a quarterly report of all EPTS cases throughout the Army Medical Command that includes name, social security number, unit, location, and diagnoses.

Access to these service-specific EPTS tracking systems will allow AMSARA to estimate reporting rates to MEPCOM by service, training site, and medical condition within any service or training site. This system will help AMSARA results to be put into fuller context and help AMSARA to estimate the burden of various medical conditions.

Detection of Young Adults with Major Psychiatric Disorders

Psychiatric disorders are relatively common in young adults aged 17–25, the population recruited to serve in the military. Therefore it is not surprising that psychiatric disorders are the primary cause of early military discharges for EPTS medical conditions. In 1998, approximately 2.4% of all accessions received an EPTS discharge for psychiatric conditions, costing the military more than an estimated \$27.3 million. Most of these conditions were either undiagnosed or concealed at the time of accession. Unfortunately, there is no test or screening examination that can reliably detect individuals with current psychiatric disorders.

In response to this need to detect psychiatric conditions before basic training, AMSARA proposed a small business initiative research project focused on the development of a rapid, inexpensive method to screen all military recruit applicants for major psychiatric disorders such as affective disorder, anxiety disorder, somatoform disorder, attention deficit disorder, and alcohol and drug abuse. Two phase I grants were funded in calendar year 2001, and two instruments were developed as part of these grants. In calendar year 2002, two companies were funded for phase II studies. Phase II will evaluate the screening methodology in a young military population for its ability to predict current and future psychiatric disorders.

A progress report will be included in the 2003 annual report.

Project REMAIN: Retention of Mild Asthmatics in the Navy

The negative impact of asthma for applicants and recruits in the military has been well documented in previous AMSARA reports. In the 2001 AMSARA Annual Report, the background and methodology of the study were outlined along with a preliminary data analysis of the participants enrolled during the first 9 months. The collection phase of these data will be completed on 30 June 2003. Final analysis will be completed by December 2003 and will be included in the 2003 annual report.

EPTS Asthma Study at Fort Jackson and Fort Knox

Asthma is consistently one of the leading causes for EPTS discharge among active duty personnel, accounting for more than 1,000 EPTS discharges each year. To prevent the high

cost associated with recruiting and training replacements for these recruits, a survey study of the recruits discharged from Fort Jackson and Fort Knox for preexisting asthma was begun in 2001.

The primary objectives are 1) to better understand how the recruit came on active duty with asthma (e.g., condition was waived, concealed, or unknown) and 2) to determine whether asthma was affecting his or her performance. AMSARA began collecting questionnaire data on soldiers receiving an EPTS discharge in January 2001 at Fort Jackson. Low asthma discharge rates at Fort Jackson prompted the addition of Fort Knox as a study site in January 2002. As of 3 February 2003, questionnaires had been completed by 211 asthmatics (68 from Fort Jackson and 143 from Fort Knox) and 1,375 nonasthmatics (1,070 from Fort Jackson and 305 from Fort Knox). Statistical analyses, to include multivariate regression models, will be conducted in 2003.

5. DATA SOURCES

AMSARA requests and receives data from various sources, most of which are the primary collection agencies for the data they provide to AMSARA. Because data are seldom collected with the goal of epidemiologic study, AMSARA coordinates with the following points of contact to ensure that data are in an appropriate form for epidemiologic work.

MEPS

AMSARA uses data on all applicants receiving a medical examination at any of the 65 Military Entrance Processing Stations (MEPS). These data, provided by the United States Military Entrance Processing Command (MEPCOM), contain approximately 235 demographic, medical, and administrative elements on recruit applicants for each applicable branch (regular enlisted, reserve, National Guard) of each service (Air Force, Army, Coast Guard, Marines, and Navy). These data also include a few officer recruit applicants and other nonapplicants receiving periodic physical examinations.

From the data provided by MEPCOM, AMSARA extracts 81 personal, medical, and administrative variables, including personal identifiers (e.g., name, SSN) for linking with other data, demographics (e.g., gender, age, race). Data also include a wide range of useful information (e.g., intended service, education level at the time of application, AFQT scores, and MEPS identification).

In addition, the MEPS records provide extensive medical examination information, including medical failure ("disqualification") codes, waiver requirements, dates of examination, hearing-vision and alcohol-drug tests, height, weight, and blood pressure.

A medical disqualification is categorized as either "temporary" (condition that can be remediated, e.g., being overweight) or "permanent" (condition that remains with the applicant, e.g., history of asthma). For those applicants with a permanent disqualification, an accession medical waiver from a service-specific waiver authority is required to be eligible for accession into the service (see "Waiver").

MEPS data are the primary source of demographic information on new accessions into the armed forces and of initial medical conditions and medical qualification status. These data are linked by AMSARA to DMDC gain files (see "DMDC Gain/Loss") to verify new accessions into the military and to provide benchmark descriptive statistics. These linked data are also used in epidemiologic investigations related to the military's medical accession standards, such as selecting and matching subjects for survival studies to compare retention patterns among new recruits with various medical histories.

Two shortcomings in the MEPS data for AMSARA have been imprecise coding categories for medical disqualifications and missing or inaccurate data for some fields. Medical disqualifications are described only as broad categories, e.g., "chest and lungs" and "feet." As a further complication in the 2001 data, the coding scheme used for medical categories was changed. Because the new coding overlaps with the previous scheme, it is often unclear

under which scheme records were coded. Accordingly, AMSARA does not show medical disqualifications at MEPS by medical category in this report.

More detailed coding of medical discharges (using ICD9 codes) was implemented by MEPCOM during calendar year 2001, which will allow more detailed studies of medical disqualifications in the future.

DoDMERB

The DoD Medical Examination Review Board (DoDMERB) performs a role similar to that of the MEPS for officer programs. Specifically, DoDMERB schedules and reviews the results of physical examinations on applicants to officer programs. Applicants may be medically disqualified on the basis of these reviews, in which case a medical waiver would be required from the relevant waiver authority for the applicant to enter the program.

AMSARA has previously received DoDMERB data on officer program applicants who were medically examined for the academic years beginning in Fall 1999 and Fall 2000 (see 2001 AMSARA Annual Report, Section 5). Data for the Fall 2001 applicants were not received in time for inclusion in this report.

DMDC Gain/Loss

DMDC provides data on individuals entering military service (gain or accession) and on individuals exiting military service (loss). Gain/loss data, which are AMSARA's primary sources of information about who is, or has been, in the military, include when an individual began duty and when or if an individual exited the military. From this information the length of service can be determined for any individual entering and leaving during the periods studied. This information is vital to survival analysis and attrition studies such as those presented in Section 2.

Gain data include approximately 50 variables. Of these, AMSARA has identified 25 of primary interest: personal identifiers (e.g., name, SSN) for linking with other data, demographics (e.g., gender, age, race) as a secondary source to MEPS, and service information (e.g., date of entry, training unit zip code). These data are combined with MEPS data to determine accession percentages among applicants by demographic and other variables.

Loss data also include approximately 50 variables, many of which are the same as those found in the gain file. Those of primary interest to AMSARA are personal identifiers for linking with other data, the loss date for computing length of service, and the interservice separation code as a secondary source of the reason for leaving the military.

A large problem in the gain data is lack of completeness, particularly for the Army from August 1997 to December 1997. AMSARA has found fewer than 800 records of new Army accessions for this period, which compares with an average of approximately 50,000 during the same months of 1995 and 1996. Analyses of accession percentages among individuals who applied for service before this time are therefore considered underestimates.

A more general problem with the loss data lies in the broad nature of the interservice separation code that characterizes the cause of the loss. Many categories have overlapping

definitions, making it difficult to determine the real cause. For example, a discharge for pregnancy that existed before service might be coded “pregnancy,” “condition existing prior to service,” or “fraudulent enlistment.” Such apparent inconsistencies have been encountered in comparing other sources of loss information (EPTS, disability discharge data) with the DMDC loss data.

Waiver

AMSARA tracks all recruits who required an accession medical waiver for entry, i.e., those who received a permanent medical disqualification at the MEPS (see “MEPS”). Each service is responsible for making waiver decisions about its applicants. Data on these waiver considerations are generated and provided to AMSARA by each service’s waiver authority and contain identifiers (name and SSN), demographics (gender, age, race), and condition(s) for which the waiver was required. The Air Force and Army code waiver conditions according to the full ICD9 coding scheme, whereas the Navy and Marines code waiver conditions according to the subset of ICD9 codes associated with medically disqualifying conditions as presented in DoD Instruction 6130.4.

Many of AMSARA’s studies begin with the waiver data. Individuals granted a waiver for a particular medically disqualifying condition are matched to the DMDC gain file to determine their date of entry, if any, into the service. These individuals constitute the pool from which main study subjects, and often their comparison subjects, are drawn. Follow-up medical information during military service is appended to these records, including all hospitalizations, EPTS discharges, and disability actions. Details of the data provided by each service’s waiver authority follow.

Air Force

The Air Force Directorate of Medical Services and Training transmits, upon request, data on all officer and enlisted accession medical waivers. These data include SSN, name, demographics, action (approved, disapproved, other), and date of waiver consideration. In addition, ICD9 codes are used to define the medically disqualifying condition(s) for which the waiver is being considered.

Army

The Army Recruiting Command (Fort Knox) has provided monthly electronic accession medical waiver data since January 1997. Each data record contains name, SSN, action (approved, disapproved, other), and date of waiver consideration. In addition, ICD9 codes are used to define the medically disqualifying condition(s) for which the waiver is being considered.

Marines

The Navy Bureau of Medicine and Surgery (BUMED) provides, on request, accession and commissioning medical waiver data for enlisted personnel and officers, along with data from special programs such as ROTC and the Naval Academy. Data include name, SSN, demographics, action (approved, disapproved, other), and date of waiver consideration. In addition, the subset of ICD9 diagnosis codes listed in DoD Instruction 6130.4 is used to define the medically disqualifying condition(s) for which the waiver is being considered.

Navy

The office of Commander, Navy Recruiting Command, provides accession medical waiver data on applicants for enlisted service in the Navy from May 2000 to the present. Before May 2000, enlisted medical accession waivers for the Navy were considered by BUMED, which then provided data to AMSARA. Data include name, SSN, demographics, action (approved, disapproved, other), and date of waiver consideration. In addition, the subset of ICD9 diagnosis codes listed in DoD Instruction 6130.4 is used to define the medically disqualifying condition(s) for which the waiver is being considered.

ROTC/Academies

The type of data collected from the ROTC programs and academies is summarized in the 1998 AMSARA Annual Report, Section 2. As initial medical examination and other data have recently become available from DoDMERB, further examination of these programs is expected.

Hospitalization

The Patient Administration Systems and Biostatistics Activity of the Army Medical Department provides hospitalization data on a yearly basis for all services except the Coast Guard. These data contain information on admissions of active duty officers and enlisted personnel to any military hospital. Information on each visit includes SSN for linking with other data, demographic information (e.g., gender, age, race), and nature of the hospitalization (e.g., medical reason(s) for admission, date of admission, date of disposition, sick days, bed days, outcome).

EPTS Discharges

Discharges for medical conditions that existed prior to service (EPTS) are of vital interest to AMSARA. A discharge can be classified as if it occurs no more than 180 days after the recruit began duty and if the condition was verified to have existed before the recruit began service. MEPCOM requests a copy of official paperwork on all EPTS discharges and records certain information about the discharge. This information includes a rough medical categorization (20 categories) of the reason(s) for discharge and a judgment on each discharge regarding why (concealment, waiver, unawareness) the person was not rejected for service on the basis of the preexisting condition.

Beginning in August 1996, this paperwork has been regularly forwarded by MEPCOM to AMSARA for additional data extraction, including more specific coding of medical conditions leading to discharge. For EPTS discharges before late 1996, AMSARA uses the data collected by MEPCOM. Therefore all analyses of EPTS discharges by medical reason will be less detailed for discharges before 1997. Within the past year, MEPCOM has also performed more precise diagnostic coding of the medical reasons for these discharges, although AMSARA continues to perform its own coding to maintain consistency. With the more detailed coding, AMSARA can examine various combinations of medical endpoints in military survival analysis studies.

The primary concern with the EPTS discharge data is completeness. Table 5.1 summarizes the numbers of records provided to AMSARA over calendar years 1997–2001. Note that the numbers of records have been unstable over time for nearly all basic training sites. Some of the variability in numbers of EPTS records over time may be due to real fluctuations in EPTS

discharge rates or to changes in the numbers of at-risk individuals (e.g., new accessions), although accession numbers of active duty personnel have been fairly stable over this period. Another possible source of fluctuation is changing schemes for categorizing discharges.

Nonetheless, it is clear that a major source of fluctuation is inconsistency in the reporting of records. For example, Lackland AFB provided only 105 records for calendar year 2000, whereas Lackland provided close to 1,000 records in each of the 3 previous years. Similarly, drops are apparent from Fort Jackson, Great Lakes, and Parris Island. Conversely, Fort Benning and Fort Sill show clear increases in the numbers of reported EPTS discharges until calendar year 2001, when Fort Sill reporting dropped dramatically.

AMSARA has addressed many of these data inconsistencies with on-site officials and continues to emphasize the importance of these data to assessing and improving the fitness of future recruits.

TABLE 5.1. EPTS DISCHARGE DATA REPORTED TO MEPCOM BY TRAINING SITE AND YEAR*

Site	1997	1998	1999	2000	2001	Total
Air Force						
Lackland AFB	1,000	1,070	994	105	228	3,397
Army						
Fort Jackson	1,913	1,767	712	354	676	5,422
Fort Leonard Wood	1,426	1,455	1,243	1,575	1,485	7,184
Fort Benning	387	535	890	1,212	1,127	4,151
Fort Sill	333	464	713	794	147	2,451
Fort Knox	666	653	506	599	649	3,073
Marines						
Parris Island	1,069	1,054	808	551	745	4,227
San Diego	743	492	526	656	193	2,610
Navy						
Great Lakes	3,542	5,343	2,664	1,913	1,865	15,327
Total	11,079	12,833	9,056	7,759	7,115	47,842

*Numbers may not sum to totals shown in Sections 3 and 4 because information from specific training sites is incomplete and other requirements for records are different

Comparisons of EPTS discharges across services, or even across different training sites within the same service, should be interpreted with caution. Any disparities may be more reflective of differences in reporting procedures than of actual differences in discharge likelihood.

Disability

Data on disability discharge considerations are compiled separately for each service at its disability agency. Air Force and Army agencies provide data on all disability discharge considerations. The Navy/Marine agency has provided data only on a diagnosis-specific request basis rather than for all actions, so AMSARA does not summarize these data.

Air Force and Army physical disability agencies provide information on all disability cases considered, including personal identifiers (name, SSN), program (regular enlisted, academy, officer), date of consideration, and disposition (permanent disability, temporary disability, return to duty as fit). For individuals receiving a disability discharge, medical condition codes and degree of disability are also included.

The Air Force and Army use the condition codes of the Veterans Administration Schedule for Rating Disabilities. This set is less comprehensive than the ICD9 codes. In some cases the disabling condition has no code, so the code most closely resembling the true condition is used. AMSARA therefore only uses broad categories of these codes rather than attempting to interpret specific codes.

Navy Recruit Training Management and Standard Training Activity Support System

The Navy's Recruit Training Management and Standard Training Activity Support System contains a large volume of data of interest to AMSARA. For each individual entering the Navy, this system collects much of the background information contained in the MEPS data. The system also maintains dates of arrival at basic training, transfer dates and locations, indicators of any medical visits while in training, and up-to-date duty locations of all Navy and Marine personnel. In addition to being a confirming source for MEPS and gain data on Navy personnel, this system allows daily tracking of individuals in training with the Navy, a vital component of Project REMAIN (see Section 4).

Appendix : Accession Medical Standards

On 14 December 2000, the DoD published an update of its "Criteria and Procedure Requirements for Physical Standards for Appointment, Enlistment, or Induction in the Armed Forces." This document is published as DoD Instruction 6130.4, and the full text can be found at <http://www.dtic.mil/whs/directives>.

DoD Instruction 6130.4 "establishes physical standards, which, if not met, are grounds for rejection for military service." DoD Directive 6130.3, published 15 December 2000, requires the implementation of DoD Instruction 6130.4 by the Assistant Secretary of Defense for Health Affairs. The standards apply to all applicants for enlistment in the Armed Forces, reserves, and National Guard, as well as Armed Forces special officer procurement programs such as the military academies and ROTC programs. The standards also apply to enlistees' first 6 months of duty for conditions predating service, cadets and midshipmen retained at the service academies, and ROTC scholarship recipients.

In addition to listing each medical condition, DoD Instruction 6130.4 provides diagnosis codes that approximately correspond to ICD9 codes. Policy attached to DoD Instruction 6130.4 directs the use of these codes "in all records that pertain to a medical condition that results in a personnel action such as separation or medical waiver."

Through these detailed coding schemes AMSARA identifies subjects for many of its studies, such as enlistees entering service with a waiver for history of surgical knee repair or enlistees being discharged for pre-existing asthma. These codes are referred to in this report as the "DoD Instruction codes" to distinguish them from the full set of ICD9 codes that are still used by some agencies to categorize certain medical actions.

CHARTER AND SUPPORTING DOCUMENTS



HEALTH AFFAIRS

THE ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D. C. 20301-1200

DEC 06 1995

MEMORANDUM FOR SURGEON GENERAL OF THE ARMY

SUBJECT: Military Medical Standards Analysis and Evaluation Data Set

The personnel community has asked OASD/HA to develop a fact based accessions policy to minimize medical attrition, quantitate risk in medical waivers, and to defend accession decisions when challenged.

The offices of Clinical Services and Military Personnel Policy have worked closely with epidemiologists at Walter Reed Army Institute of Research on the concept of a Military Medical Standard Analysis and Evaluation Data Set (MMSABDS) to apply quantitative analysis to a longitudinal data base.

The Army Center for Health Promotion and Preventive Medicine (CHPPM) maintains a data base of personnel, hospitalization, deployment and separation information for all Services. I would like WRAIR, in coordination with CHPPM, to serve as consultants to the Accession Medical Standard Steering Committee, modify and maintain the data base, and coordinate field research to answer specific questions germane to accession policy.

Therefore, I request that, by the end of December 1995, a proposal be submitted through you from WRAIR, outlining the consultant role and modifications needed to the data base. This should include funding requirements.

Edward D. Martin /for
Stephen C. Joseph, M.D., M.P.H.

cc:
Commander WRAIR

HA Control #: NONE
Due Date: NONE

February 28, 1995

ASSISTANT SECRETARY OF DEFENSE
(HEALTH AFFAIRS)
EXECUTIVE SUMMARY/COVER BRIEF

MEMORANDUM FOR THE ASSISTANT SECRETARY OF DEFENSE
(HEALTH AFFAIRS)

THROUGH: *Jm* Dr. Sue Bailey, DASD (CS)
FROM: Action Officer, Colonel Ed Miller
SUBJECT: Accession Medical Standards Analysis and Research
Activity (AMSARA)
PURPOSE: SIGNATURE--on request that the Assistant Surgeon
General of the Army (Research and Development)
establish an Accession Medical Standards Analysis
and Research Activity (AMSARA).

DISCUSSION:

The Accessions Medical Standards Working Group which met over the summer sponsored through MFIM funding completed a functional economic analysis of the medical accessions examination process. One of the critical recommendations made by the Group was to establish a research activity to provide the Medical Accessions Standards Council (also recommended) with an evidence-based analysis of DoD accessions medical standards. The memorandum tasks the Army with the responsibility of establishing the activity resourced under the Defense Health Program. This has already been staffed with the Assistant Surgeon General of the Army (Research and Development)

RECOMMENDATION:

Sign tasking memorandum to Army Surgeon General.

COORDINATION:

✓ Mr. Conte, PDUSD(P&R) _____
✓ Mr. Maddy, HB&P: See attached memo
✓ Mr. Richards, EO: _____
Dr. Martin, PDASD: _____

DEPARTMENT OF DEFENSE
ACCESSION MEDICAL STANDARDS
STEERING COMMITTEE

CHARTER

I. ESTABLISHMENT, PURPOSE AND SCOPE

A. ESTABLISHMENT

The Under Secretary of Defense (Personnel and Readiness) establishes a Department of Defense Accession Medical Standards Steering Committee (hereafter referred to as the "Committee".) The Committee shall operate under the joint guidance of the Assistant Secretaries of Defense (Force Management Policy and Health Affairs [FMP & HA].)

B. PURPOSE

The Committee's main objective is to ensure the appropriate use of military members with regard to medical/physical characteristics, assuring a cost-efficient force of healthy members in military service capable of completing initial training and maintaining worldwide deployability. The primary purposes of the Committee are: (1) integrating the medical and personnel communities in providing policy guidance and establishing standards for accession medical/physical requirements, and (2) establishing accession medical standards and policy based on evidence-based information provided by analysis and research.

C. SCOPE OF ACTIVITY

1. The Committee's responsibility involves:

- a. Providing policy oversight and guidance to the accession medical/physical standards setting process.
- b. Directing research and studies necessary to produce evidenced-based accession standards making the best use of resources.
- c. Ensuring medical and personnel coordination when formulating accession policy changes.
- d. Overseeing the common application of the accession medical standards as outlined in DoD Directive 6130.3, "Physical Standards for Appointment, Enlistment, and Induction."

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- e. Interfacing with other relevant Department of Defense and Department of Transportation organizations.
- f. Recommending promulgation of new DoD directives as well as revisions to existing directives.
- g. Recommending legislative proposals concerning accession medical/physical processing.
- h. Reviewing, analyzing, formulating and implementing policy concerning the accession physical examination.
- i. Issuing policy letters or memoranda providing interpretation of provisions of DoD directives.
- j. Resolving conflicts of application of accession medical/physical standards and policies among the Military Services and other authorized agents.
- k. Maintaining records and minutes of Committee meetings.

II. ORGANIZATION

A. The Committee will be co-chaired by the Deputy Assistant Secretary of Defense (Military Personnel Policy) and the Deputy Assistant Secretary of Defense (Clinical Services). This will facilitate tasking the Deputy Chiefs of Staff for Personnel and the Surgeons General to assign staffers to relevant working groups, and to ensure DCS/Personnel and Surgeon General personal involvement with the various issues. The Committee will convene semiannually, at a minimum, and at the discretion of the Chairpersons.

B. Committee members are appointed by the Under Secretary of Defense (Personnel and Readiness) and provide ongoing liaison with their respective organizations concerning matters of medical/physical accession policy.

C. The Committee shall be composed of representatives from the following:

Office of the Assistant Secretary of Defense (Force Management Policy)

Office of the Assistant Secretary of Defense (Health Affairs)

Office of the Assistant Secretary of Defense (Reserve Affairs)

Office of Service Surgeons General

Office of Service Deputy Chiefs of Staff for Personnel, and Chief of Personnel and Training, HQ U.S. Coast Guard.

D. Representatives from the Office of the Assistant Secretary of Defense (Force Management Policy) and the Office of the Assistant Secretary of Defense (Health Affairs) shall serve as executive secretaries for the Committee, and maintain a working group, composed of representatives from each of the offices mentioned above, to receive and review issues pertinent to accession policy.

E. The Commander, U.S. Military Entrance Processing Command, and the Director, DoD Medical Examination Review Board shall serve as advisors to the Committee.

F. The Committee may invite consultants (i.e., training, recruiting, epidemiology) at the discretion of the Chairpersons.

Approved: JAN 16 1996
Date

A handwritten signature in black ink, appearing to read 'EDWIN DORN', with a large circular flourish at the end.

EDWIN DORN

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Acronyms

AD	active duty	HS	high school
AFB	Air Force base	HSIL	high-grade squamous intraepithelial lesion
AFQT	armed forces qualifying test	ICC	invasive cervical carcinoma
AMSARA	Accession Medical Standards Analysis and Research Activity	ICD9	international classification of diseases, 9 th revision
AMSWG	Accession Medical Standards Working Group	IET	Initial Entry Training
ASCUS	atypical squamous cells of undetermined significance	ISC	Inter-service Separation Code
BCT	Basic Combat Training	LSIL	low-grade squamous intraepithelial lesion
BMI	Body Mass Index	MEBITT	Medical Examination Boards Internal Tracking Tool
CHPPM	Center for Health Promotion and Preventive Medicine	MEPCOM	military entrance processing command
CI	confidence interval	MEPS	military entrance processing station
CIN	cervical intraepithelial neoplasia	NA	not applicable
CSB	College Scholarship Branch	NIHL	noise induced hearing loss
CY	calendar year	PAD	Patient Administrative Division
df	degrees of freedom	PASBA	Patient Administration Systems and Biostatistical Activities
DMDC	Defense Manpower Data Center	RAP	Recruit Assessment Program
DMSS	Defense Medical Surveillance System	ROTC	Reserve Officer Training Corp
DoD	Department of Defense	RR	relative risk
DoDMERB	DoD Medical Examination Review Board	SSN	social security number
DQ	disqualification	TMD	temporomandibular disorder
EPTS	existed prior to service	WRAIR	Walter Reed Army Institute of Research
FEV	forced expiratory volume		
GED	general educational development		

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